TECHNOLOGY

THE PAPER INDUSTRY and PAPER WORLD

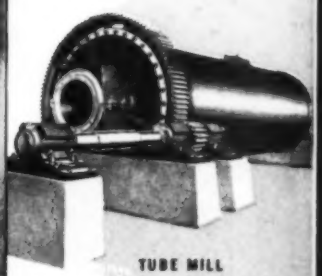
AN EDUCATIONAL NEWS MAGAZINE — FEBRUARY, 1944

WER AGITATOR DRIVE

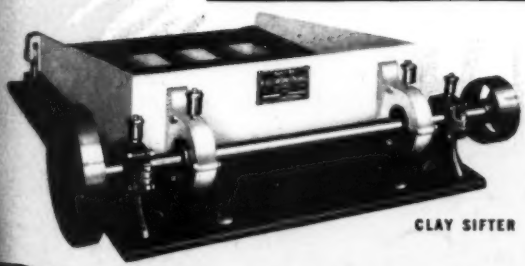
BLE AGITATOR

PERFORMANCE
-the vital quality in paper production today-
BY
PATTERSON

CLAY AND COATING MIXER



TUBE MILL



CLAY SIFTER

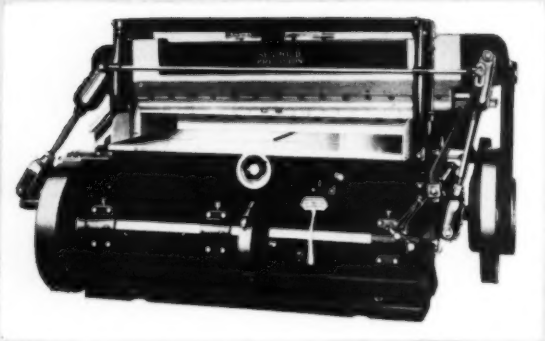
PULP AGITATOR

Patterson Machinery

THE PATTERSON FOUNDRY & MACHINE CO.
EAST LIVERPOOL, OHIO, U. S. A.

Richard L. Cummings
President

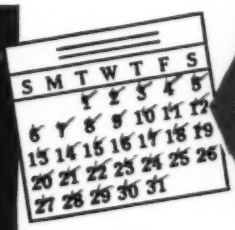
Your Seybold Maintenance Calendar for 1944



War time restrictions have made available no **new* Seybolds. But with the simple, easy procedure given below you can keep *your* Seybold in good working condition for years and years. Should you need repairs, our nearest office will serve you promptly.

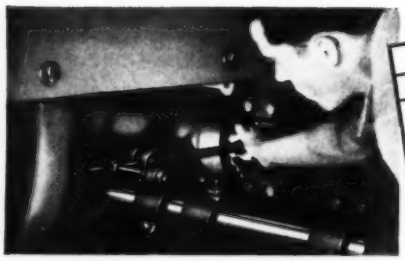
**A few models have been released for manufacture by W.P.B. If you have war applications and need a machine, write us.

and many years of good service to come!



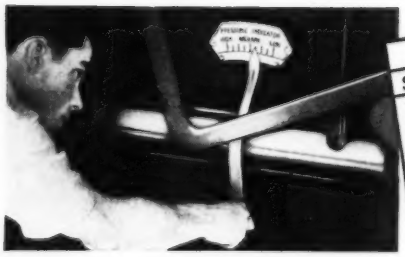
Every DAY do this

Lubricate drive shaft bearings, clutch and moving parts. Inspect cutting knife.



Every WEEK do this

Check the clutch and brake adjustment.



Every MONTH do this

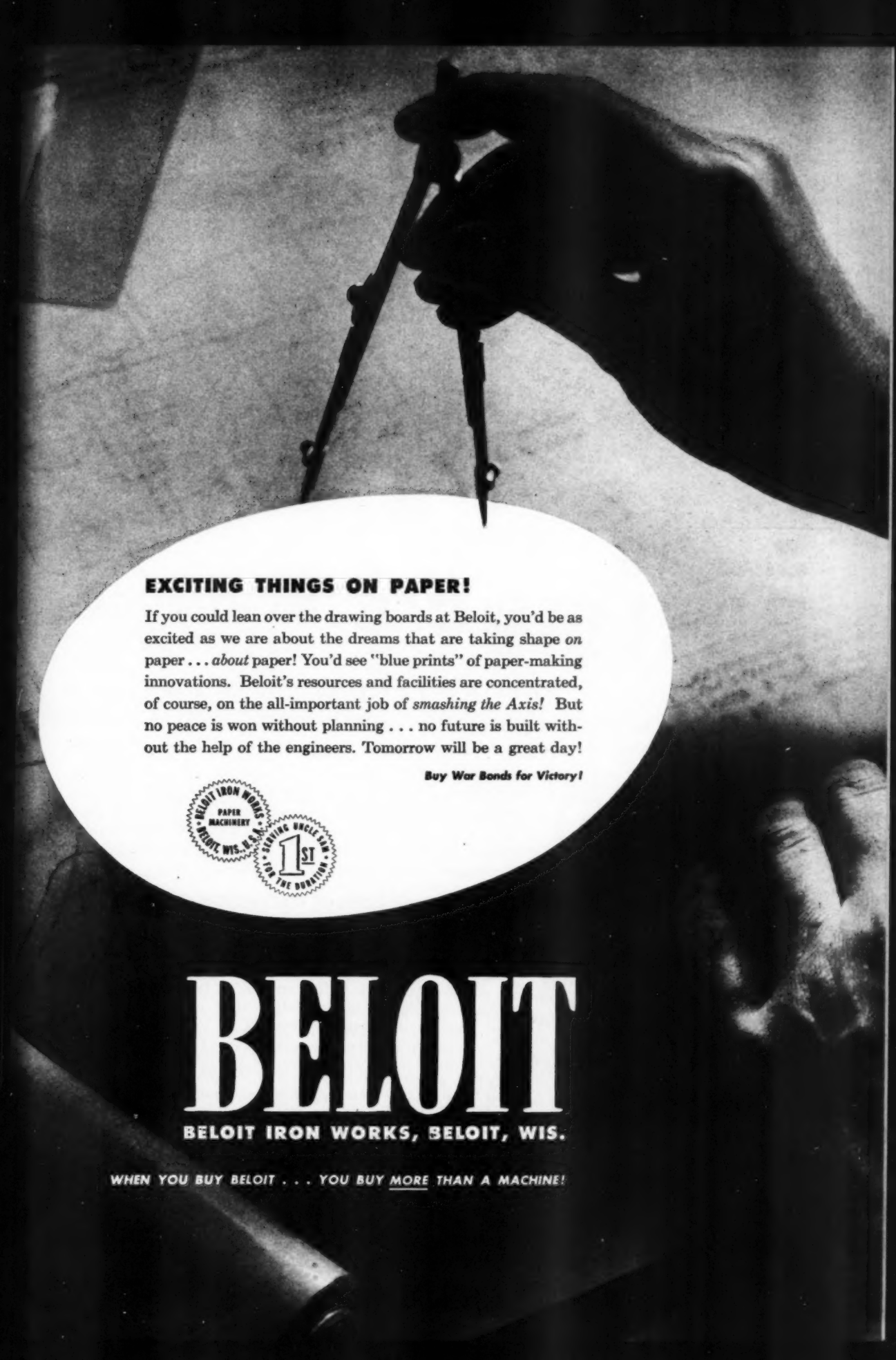
Inspect the clamp pressure mechanism.

SEYBOLD

• DIVISION •

HARRIS-SEYBOLD-POTTER COMPANY

323 WASHINGTON ST., DAYTON 72, OHIO



EXCITING THINGS ON PAPER!

If you could lean over the drawing boards at Beloit, you'd be as excited as we are about the dreams that are taking shape *on* paper . . . *about* paper! You'd see "blue prints" of paper-making innovations. Beloit's resources and facilities are concentrated, of course, on the all-important job of *smashing the Axis!* But no peace is won without planning . . . no future is built without the help of the engineers. Tomorrow will be a great day!

Buy War Bonds for Victory!

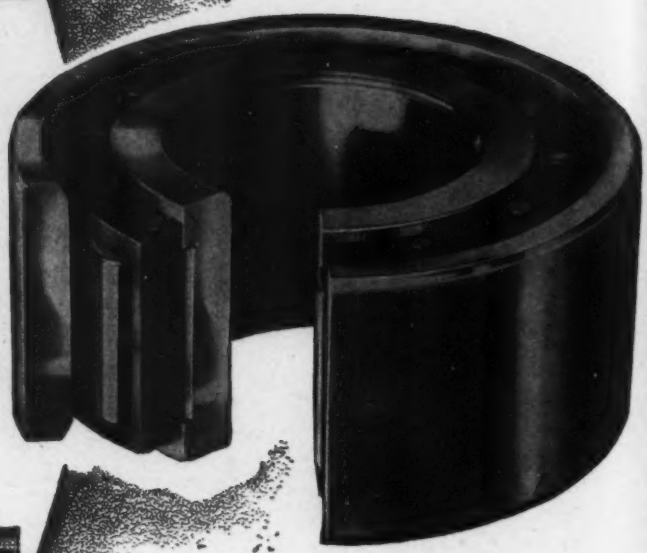
BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS., U.S.A. · SERVING UNCLE SAM · 1ST · FOR THE DURATION ·

BELOIT

BELOIT IRON WORKS, BELOIT, WIS.

WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE!

When Costs Count OVERLOADED BEARINGS MUST GO!

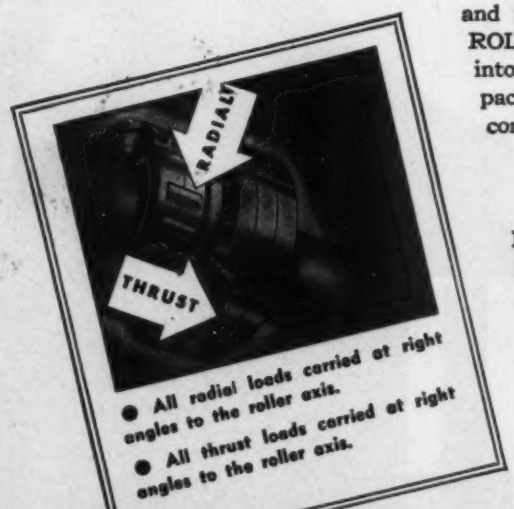


Switch to ROLLWAY'S RIGHT-ANGLE LOADING

before re-conversion starts . . .

The day is coming when fractions of a mill—not fractions of a minute—will win or lose orders. Buyers will worry about maintenance, not manpower . . . about saving money instead of metals.

You'll be sitting pretty if your machines offer the long life and freedom from trouble of ROLLWAY RIGHT-ANGLE ROLLER BEARINGS. Because Rollways split the load into *pure* radial and *pure* thrust! They increase load capacity . . . banish overloads . . . eliminate the oblique and composite forces which overreach elastic limits.



● All radial loads carried at right angles to the roller axis.

● All thrust loads carried at right angles to the roller axis.

PURE RADIAL OR PURE THRUST BEARINGS

There's no doubling up of load components with Rollway Bearings. Each load component is carried by a separate bearing assembly. That means thrust bearings that carry *pure* thrust, and radial bearings that carry *pure* radial—nothing else. Load capacity in given dimensional limits is greater. Unit loads per roller and bearing are lower. And the hazard of permanent set or quick failure due to overloads practically vanishes.

Don't wait until re-conversion problems overwhelm you. Find out now. Send drawings or detailed description for free bearing analysis and recommendation. S.A.E. or American Standard metric dimensions and tolerances are available for most applications, assuring quick supply and low cost.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 — BEARINGS

IN THE BAG!

THAT'S where all the shooting's from...a cellulose bag to protect our soldiers from aerial gas attacks.

The paper industry has brought out many war uses for paper products, just as present operating conditions have brought out the added value of Texaco paper mill lubrication.

In drier sections and calenders, for example, *Texaco Ursa Oils* assure normal bearing temperatures under all operating conditions, by carrying away the heat with clean, cool oil to every bearing in the system. Uniformly easy to filter and reclaim.

So effective have Texaco lubricants proved that they are definitely preferred in many fields, a few of which are listed on the right.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States.

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

TEXACO

TEXACO Lubricants

FOR THE PAPER INDUSTRY

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

SODIUM CHLORITE: A product of Mathieson Research!

A powerfully efficient oxidizing agent – easily controlled – that operates effectively over a wide range of conditions from highly acid to highly alkaline.

Sodium Chlorite does the job you want done – and only that!

In years an infant, in accomplishments a prodigy – Mathieson Sodium Chlorite has made vital contributions in manufacture and processing:

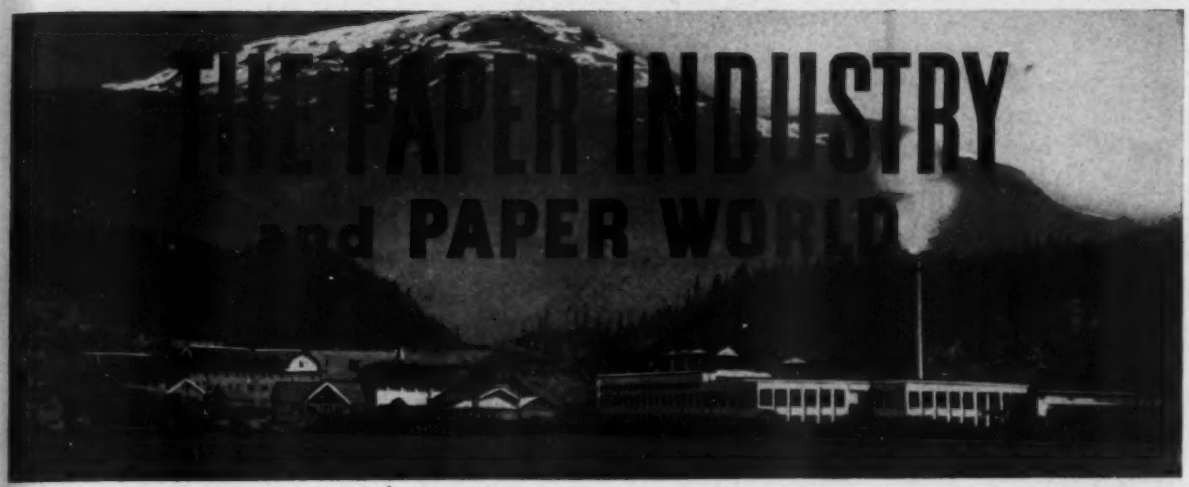
- oxidization of vat dyes in textile field.
- bleaching of cotton without danger of degradation.
- bleaching cellulose acetate – no saponification hazard.
- simultaneous scouring and bleaching of cotton-rayon mixtures.
- bleaching paper pulp to exceptional, high brightness with superior quality.
- refining and bleaching sugar and sugar melts at lower costs with increased recoveries.
- speeding the bleaching of waxes.

And now, Mathieson Sodium Chlorite wants new fields to conquer. For we can't compound the stimulus but you must fire the mold. So here it is – complete information is yours for the asking.

Mathieson Sodium Chlorite

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42ND ST., NEW YORK 17, N. Y.

SODIUM CHLORITE PRODUCTS . . . CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . AMMONIA, ANHYDROUS & AQUA . . . HTH PRODUCTS . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE . . . DRY ICE . . . CARBONIC GAS . . . SODIUM METHYLATE



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VOLUME 25 — FEBRUARY, 1944 — NUMBER 11

—FEATURES—

Patents and the Paper Industry ..... *M. P. Chaplin* 1221
The Electron Tube—Genie, Gremlin, or Jeep? ..... *W. D. Cockrell* 1230
Reducing Absenteeism and Turnover ..... *Lawrence Stessin* 1233
A Papermaker Looks at Postwar Planning ..... *H. M. Grasselt* 1235
Newsprint Paper in 1943 ..... *Royal S. Kellogg* 1256
Pulpwood—the Paper Industry's No. 1 Problem 1258
Common Sense in Postwar Planning ..... *George S. May* 1262
Convention Papers . . . Abridged 1264

—NEWS—

Men Wanted 1190
Trade Winds 1191
Allied 1238
Associations 1242
Safety 1246
Names in the News 1248
Personals 1248
Necrology 1250

—DEPARTMENTS—

Editorials 1213
Current Thought 1214
Paper Sketches 1237
Coming Events .....
Safety Contest Scores 1246
Practical Shorts 1252
New Equipment and Supplies 1280
Technical Developments 1284
Papermaking Patents .....
New Publications 1286
Current Market Quotations 1288
Index to Advertisers 1291

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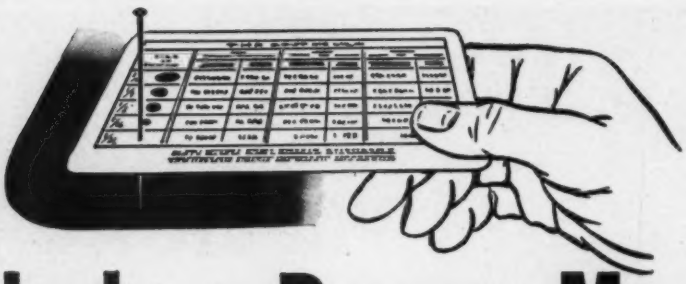


How Big is a pinhole in a PAPER MILL?

Big enough to cause a lot of trouble—when the pinhole is in the seating of a valve that's supposed to be shut off *tight*.

Here's the story in terms of normal pressures:

At 100 lbs. — STEAM — 3,175 lbs. wasted per month per valve

At 100 lbs. — AIR — 69,552 cu. ft. wasted per month per valve

At 40 lbs. — WATER — 4,800 gals. wasted per month per valve

This is just a $\frac{1}{32}$" hole, at normal pressures. A pinhole across the seat of a 1" valve is a leak that might have called for a new valve before the war In a 15" valve, on the other hand, it may be regarded as "normal seepage."

The point is, you can *reseat* ANY globe valve from $\frac{1}{4}$" to 14"; or ANY gate valve from $1\frac{1}{2}$" to 48"; *without removing it from the line,* and you'll come out with a valve that doesn't leak at all! . . . not even "normal seepage!" All you do is remove the bonnet and insert a Dexter Valve Reseating Machine. In a few minutes you have cut a new face on the ports: a face that is true — in fact, better than usually found in a new valve.

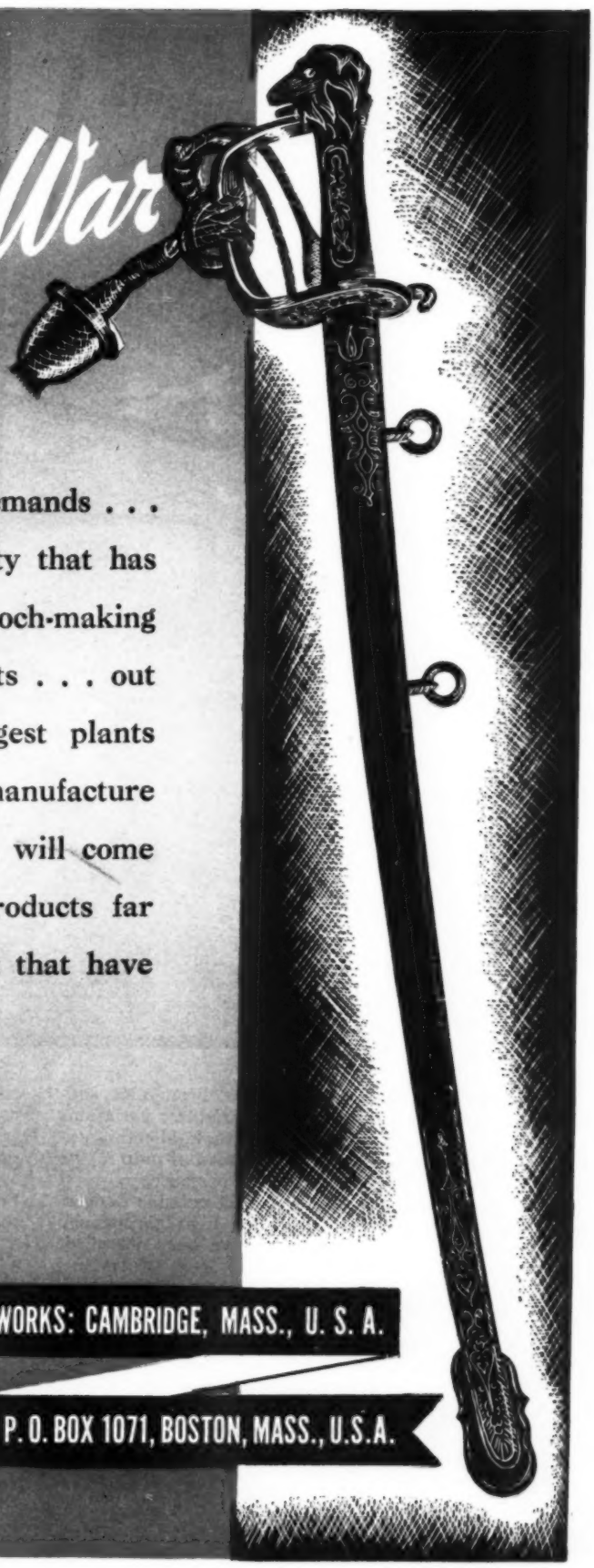
There are Dexter outfits specially designed for reseating reciprocating pump valves from 2" to 15".

In most cases a valve can be reseated on the line in less time than would be required for removal and replacement.

Have you any leaky valves? Write us about them — we'll recommend the Dexter Valve Reseating Equipment that will handle your situation economically.

THE LEAVITT MACHINE COMPANY
ORANGE, MASSACHUSETTS

WHEN THE *Sword of War* IS SHEATHED



Out of war's insatiable demands . . . out of experience and ability that has made rubber history in epoch-making inventions and improvements . . . out of one of the world's largest plants devoted exclusively to the manufacture of mechanical rubber goods, will come belting, hose and similar products far surpassing the world's finest that have come so far.

BOSTON WOVEN HOSE AND RUBBER COMPANY

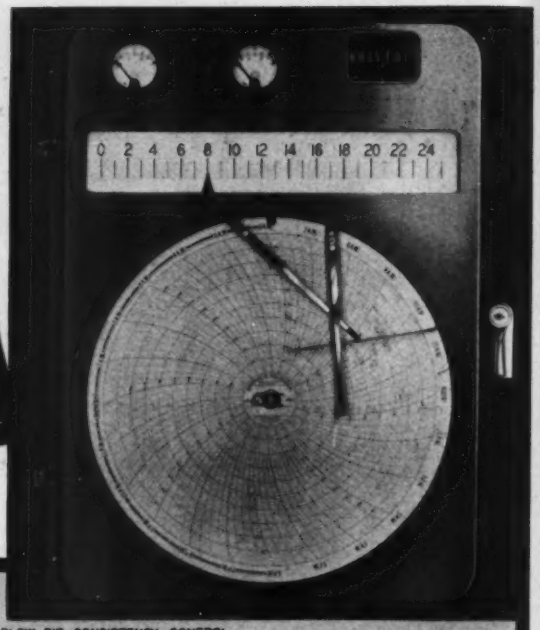
BWH

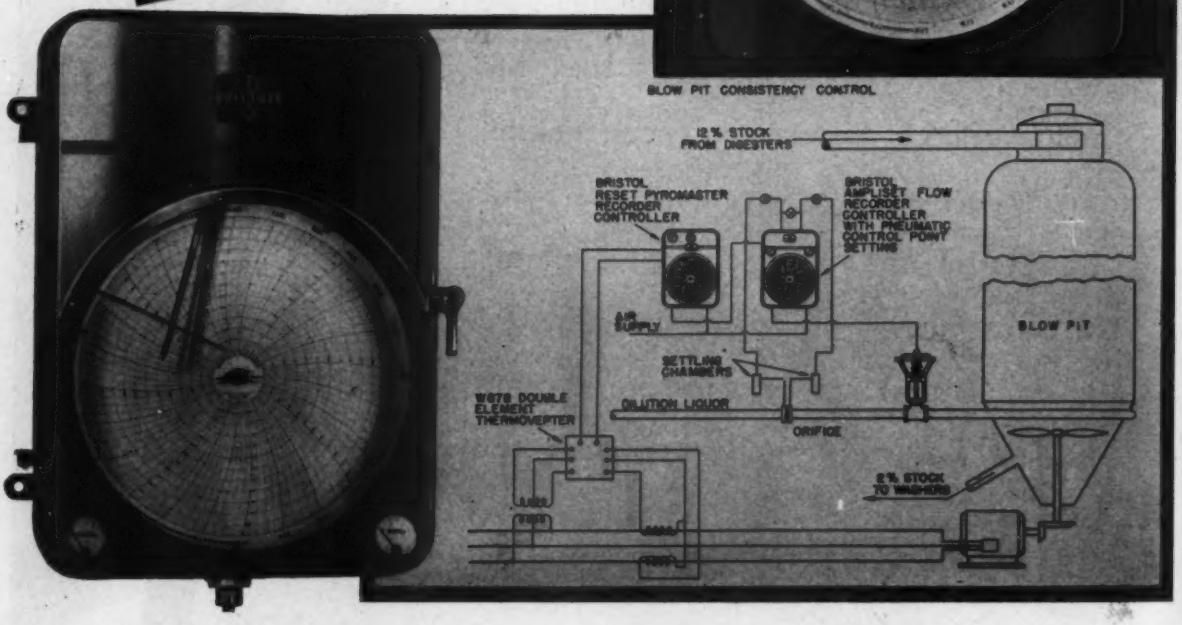
WORKS: CAMBRIDGE, MASS., U. S. A.

P. O. BOX 1071, BOSTON, MASS., U.S.A.

These Bristol Instruments for Blow Pits

WILL HOLD DILUTION LIQUOR FLOW CONSTANT AND PRODUCE CONSTANT OUT-GOING CONSISTENCY OF 2%





Rate of flow of dilution liquor through the control valve is subject to two variables: variations in level in black liquor storage tank, affecting upstream pressure; variations in head of pulp in the blow pit, affecting downstream pressure.

To protect against the several possible dangerous conditions resulting from high consistency stock, Bristol Instruments have been installed, operating as follows:

Bristol's Ampliset Flow Recorder Controller operates the synchro valve to hold flow constant.

Bristol's Reset Pyromaster Wattmeter responds to changes in motor load (caused by changes in consistency of stock from digester) and sets control point on flow controller to a higher or lower value.

This application of Bristol Instruments should be attractive to any sulphate pulp mill planning a modernization program.

THE BRISTOL COMPANY, 149 Bristol Road
WATERBURY 91, CONN.

The Bristol Co. of Canada, Ltd. Toronto, Ontario
Bristol's Instrument Co., Ltd. London N W 10, England

Engineers Process Control for Better Products and Profits

AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS

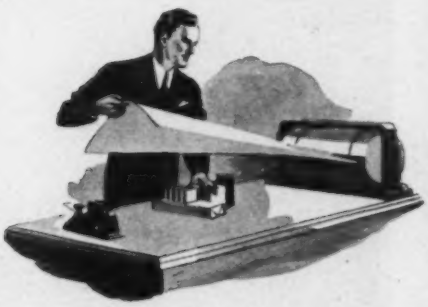
THE BRISTOL COMPANY, Waterbury 91, Connecticut

The Bristol Co. of Canada, Ltd. Toronto, Ontario
Bristol's Instrument Co., Ltd. London, N. W. 10, England

PUT MOLD OUT OF BUSINESS

Penicillin is one of the rare examples of mold doing a beneficial job. But for the most part, mold has always been an enemy—especially in your business and in your product.

Dow has devoted many years' research to the development of 17 related products—the Dowicides—to defeat mold and bacteria growth in their attacks on industry. These products are, in a sense, new, but they are nevertheless already doing an outstanding job in putting mold out of business in the paper, paint, textile and leather fields.



Because of high humidity present at most stages of paper manufacture, mold is a serious problem. Since lap-stock retains a high moisture content and is usually stored before use, many manufacturers are now applying Dowicides at the lapping machine. Pulp that is held in stock chests for some time is liable to "sour" and here again Dowicides are defeating mold and protecting the quality of the pulp. Where it is desirable to produce mold-resistant paper —for example, paper for soap wrappers— Dowicides can be added in manufacture as permanent protection against mold. Adhesives used in paper manufacture can be similarly treated. Write to the Dowicide Division for additional details on how to put mold out of business—your business!

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

New York • Boston • Washington • Philadelphia • Chicago
St. Louis • Houston • San Francisco • Los Angeles • Seattle

DOWICIDE

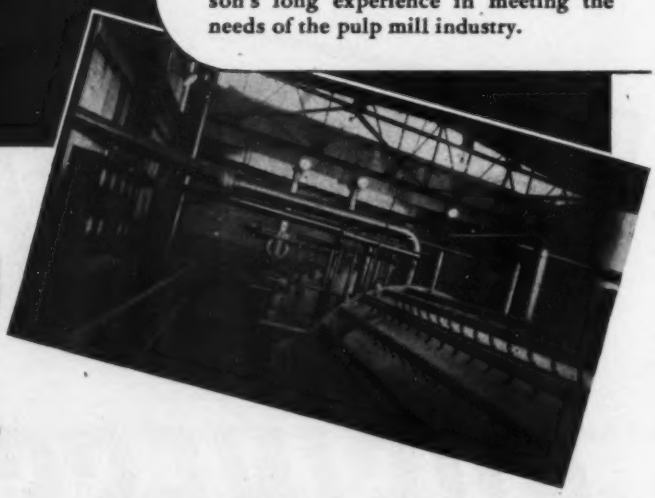
GERMICIDES AND FUNGICIDES

Other Dow products for the Paper Industry include: Methocel, Ethocel, Caustic Soda and many other chemicals.

DOW
CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

This **MULTI-STAGE** pulp washer does the work of *Two or More Ordinary Drums*

This new high efficiency equipment has been developed as a result of Swenson's long experience in meeting the needs of the pulp mill industry.



The New SWENSON-NYMAN WASHER *for kraft or soda pulp*

Improvements incorporated in the Swenson-Nyman Pulp Washer permit multi-stage washing on a single drum. It has sheet-washing area double the forming area, with independently controlled vacuum on both cycles. Black and weak liquors are removed and discharged separately.

Backwashing is entirely eliminated. Pick-up and sheet formation are uniform, even with extremely hard and free pulps.

Various installations in use for the past several years indicate that a single Swenson-Nyman Pulp Washer will successfully replace two (and sometimes three) ordinary drums.

The development of this equipment indicates how Swenson engineers have carried on design and research toward increasing pulp mill efficiency during the period when Swenson production facilities have been tied up with important war orders.

Black Liquor Evaporators • Lime Sludge Filters • Pulp Washers • Causticizers • Digester Blow Condenser Heat Recovery Systems.

SWENSON

SWENSON EVAPORATOR COMPANY

Division of Whiting Corporation

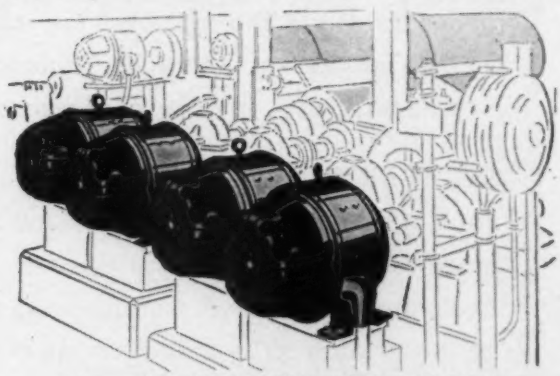
15653 Lathrop Avenue, Harvey, Ill.

VERSATILE!

To anyone accustomed to thinking of motor-drive as primarily a source of power alone, the *versatility* of Reliance Motor-drive is often a source of genuine surprise.

Without clutches, gears or complicated controls, it provides for quick but smooth acceleration—speed variation with very slow speeds for inching—automatic reversing—quick stopping—control of tension—all these readily adaptable to a wide variety of operations in many industries.

The results of Reliance pioneering with many applications of motor-drive are worthy of serious attention in connection with any problem involving machine design or the improvement of production processes. A Reliance engineer will be glad to place the results of this experience at your service any time.



The versatility of Reliance Motor-drive is typified by its application to 4-drum paper winders. Features are: convenient, accurate, safe control. Results are: uniform, snug rolls that please the men who buy and use them.

RELIANCE A-C D-C MOTORS

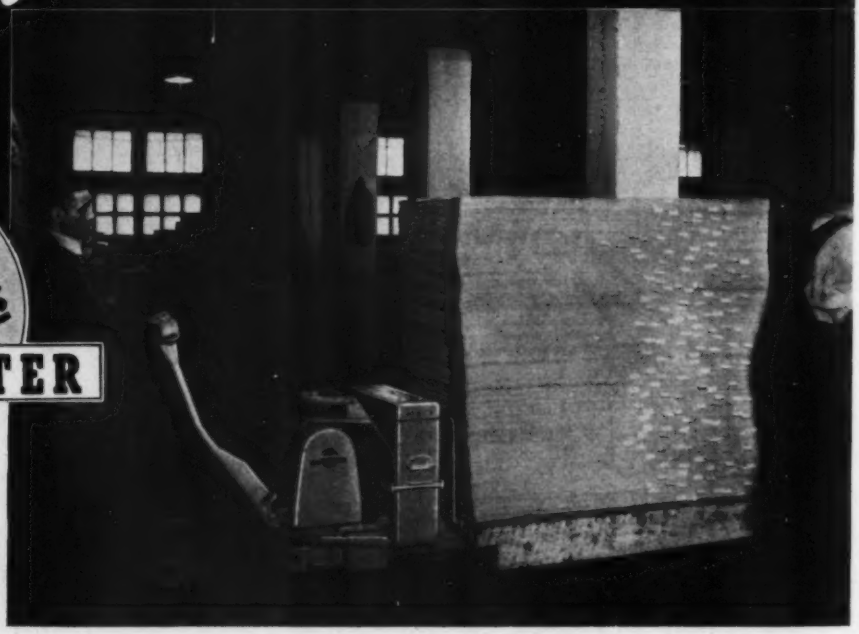
RELIANCE ELECTRIC & ENGINEERING CO.

1088 Ivanhoe Road • Cleveland, Ohio

Birmingham • Boston • Buffalo • Chicago • Cincinnati • Detroit • Greenville (S.C.) • Houston • Los Angeles • Minneapolis • New York Philadelphia • Pittsburgh • Portland (Ore.) • St. Louis • Salt Lake City • San Francisco • Syracuse • Washington, D. C. • other principal cities.

WATCH HANDLING EFFICIENCY GROW AS *Tons* OF PAPER STOCK FLOW

Automatic TRANSPORTER



NO STRAINING--TUGGING--PULLING NOR PUSHING---

Positive mechanical brake —controls in steering handle—forward and reverse speeds — front wheel power drive — shockless hydraulic platform lift with easy foot control.

•

A trucker and a TRANSPORTER can transport the same tonnage of material a given distance that would require the physical effort of three men handling in the conventional way.

•

The TRANSPORTER is built in 4000 and 6000 pound capacity platform type lift trucks for skid transportation and in a pallet type fork lift truck for unit loads up to 4000 pounds on open- or double-faced pallets.

•

★ Paper stock in bulk or packaged is transported with the greatest of ease—and speedily too—as the trucker simply guides the load. The control of the movement of the truck is in the handle—at the trucker's finger tips—without effort he can start, stop, reverse, or increase speed.

The TRANSPORTER is particularly adaptable for short hauls within the plant—it handles loads in elevators, along narrow aisles, and is valuable for use in areas where floor loads are restricted. A foot operated hydraulic lift system permits trucker to lift loads in congested places.

Get details on this modern material-handling truck that simplifies transportation and cuts costs.

•

MANUFACTURERS FOR OVER THIRTY FIVE YEARS *Electric Propelled* INDUSTRIAL TRUCKS

AUTOMATIC TRANSPORTATION CO.

113 WEST 87th STREET — DIV. OF THE YALE & TOWNE MFG. CO. — CHICAGO 20, ILLINOIS

EASES *the way*

ON HIGH-SPEED NEWSPRINT MACHINES

An SKF Bearing is only a small part of the dryer section of this 234" High Speed Newsprint Machine, but it plays a tremendous part in its performance. Its inherent alignment compensates for any misalignment caused by side frame warpage. Its freedom from wear means less wear in driving gears. By maintaining the cylinders in proper position, it relieves felt strain . . . assures satisfactorily-finished Paper Stock. Multiply these advantages by the number of SKF's on this machine and you have an idea of how SKF's ease the way in the production of paper for war needs. 5469

SKF INDUSTRIES, INC., PHILADELPHIA 34, PA.

SKF - EQUIPPED

Dryer Section

Built by Pusey & Jones Corp. SKF Bearings are also on wheel drum and calender stack.

US VICTORY PULPWOOD CAMPAIGN

TOOL ? :OUBLE AEN.
Dodge Ch tgo Plar off full time, war-us ul jobs.) nty f room for upgra ng, good tart g salary. Modern lant,, fin ma inery. Let

MEN WANTED

to harvest a crop that is of vital importance. Pulpwood is an essential war material and the Forest Products Bureau states that 14,000,000 cords will be needed in 1944. Draft boards will give deferment credits for woods work, and farmers can hold draft status cutting pulpwood. If you can help the fight on the home front by using an ax, write or call your local U. S. Employment Service Office.

ELECTR AL DR. FTSN N.
Electri l Engin rs wit industrial one o our frien y int viewers help you nd out w ere y u will fit best. Training pr ram fo inex; ienced men and wo en. Op ings ! ::

The plea for pulpwood cutters has been widely published. It has penetrated the ranks of the Armed Forces, even into the war theatre. The War Activities Committee of the Pulpwood Consuming Industries has had many letters from men in different branches of the service, and "Believe it or not," these men are eager to serve on the home front to help cut pulpwood, so essential for the manufacture of supplies for the war front.

These service men offer to spend precious furloughs helping to cut pulpwood. Honorably discharged men recently returned from combat zones have enlisted in the Axes Army and many have been placed with pulpwood producers in areas selected by them. A Marine in training wrote to say that his interest was aroused by the fact that one average tree will provide enough smokeless powder to fire 7,500 rounds of a Garand rifle. He added "That means at least 7,000 fewer Japs."

Patriotic civilians can do no less—it's harvest time in the woods.

Now is the time to cut or thin your timber while prices are high and pulpwood is badly needed.

CUT wisely and the remaining trees will grow faster and bigger. Your forester or county agent will help you select trees for cutting.

ESTIMATE how many cords you can cut. Then get in touch with our local dealer, or telephone, or write us for prices and specifications.

TRADE WINDS

WPB STATEMENT ON 1944 PULPWOOD PRODUCTION

▶▶▶ PRODUCTION OF 14,000,000 cords of domestic pulpwood will be necessary in 1944 to supply the expanded needs for paper and pulp products of our armed forces overseas and for essential home front war requirements, according to a recent announcement by James L. Madden, Deputy Director of the War Production Board Paper Division who is in charge of pulpwood.

The 1944 goal is 1,000,000 cords greater than that estimated by WPB as the minimum need for 1943. The additional 1,000,000 cords is necessary for packaging materials, especially weather-proof paper and kraft board for packaging and shipping munitions, foods and medical and other supplies to foreign battlefronts and for the multitude of containers needed for agricultural and civilian supplies, Mr. Madden said.

Meanwhile, the 13,000,000-cord goal for 1943 is believed to have been attained, according to Mr. Madden. Receipts at mills for the first eleven months approached 12,000,000 cords, while preliminary estimates indicate that deliveries in December reached 1,000,000 or more cords. The 1943 drive to increase production of pulpwood for war purposes received its greatest impetus through the Newspaper Pulpwood Campaign, in which the daily press and more than 1,500 weekly newspapers in 27 of the producing states participated.

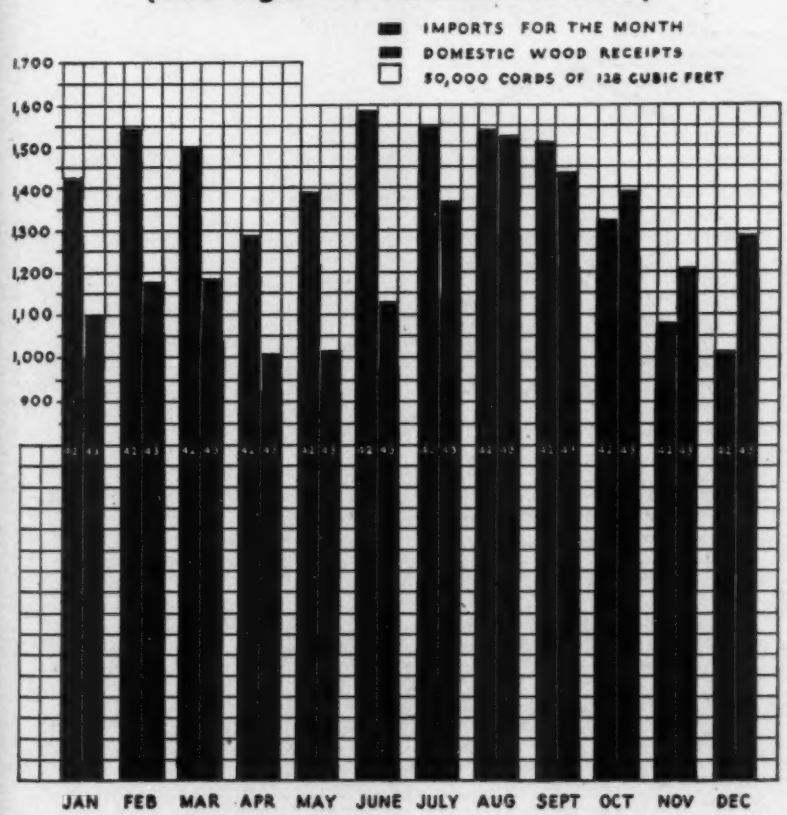
The 14,000,000-cord goal for 1944 has been apportioned to the five major pulpwood producing regions based on past production records, as follows:

Region	Goal
Appalachian	1,550,000 cords
Northeast	1,900,000 cords
Lake States	1,450,000 cords
South	6,600,000 cords
Pacific Northwest	2,500,000 cords
Total for U. S.	14,000,000 cords

States included in the respective regions are: Appalachian: Pennsylvania, Virginia, West Virginia, North Carolina, Tennessee, Kentucky, Delaware, Ohio and Maryland. Northeast: Maine, New Hampshire, Vermont and New York. Lake: Minnesota, Michigan, Wisconsin, Indiana, and Illinois. South: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, South Carolina, Oklahoma, and Texas. Pacific Northwest: Oregon and Washington.

Despite severe manpower and transportation equipment shortages, Mr.

1942-1943 Pulpwood Receipts at U. S. Mills (WPB Figures in Thousands of Cords)



Annual Receipts (in thousands of cords)

	1941	1942	1943
Domestic	13,744	14,480	13,096
Imports	2,281	2,232	1,718
Over-All	16,025	16,712	14,814

Madden expressed the conviction that the 1,000,000 extra cords can be produced in 1944 through intensified co-operation of Government agencies, newspapers and the industry.

"This is going to be a tough job," said Mr. Madden, "but it can and must be done. The newspapers in pulpwood producing areas and the pulpwood industry, through their successful efforts in 1943, have paved the way for the expanded program this year. The War Production Board, the War Food Administration and the War Manpower Commission are now co-operating closely in an intensified drive to get farmers to work in their timberlands, cutting forest products, or to work temporarily in forest industries during the slack winter months.

"Pulpwood cutting by farmers should be encouraged to the utmost from now until plowing time and, of course, in accordance with sound forest practices. Because of the extremely short season, farm wood cutting operations should begin without delay to assure this vitally needed production.

"Moreover, it is now that the need is greatest, as America and her allies prepare for the great invasions of this war. A cord of pulpwood now may be as important to the war effort as ten cords would be a year or even six months from now. Our fighting men depend upon pulpwood products and packaging on every battlefront."

◆

JAN. INDUSTRY REPORT PULP AND PAPER

In co-operation with the Forest Products Bureau, WPB, the Pulp and Paper Unit of the Bureau of Foreign and Domestic Commerce expects to release monthly Industry reports on pulp and paper which will contain the latest statistical data and general information on developments, trends, and problems within the industry. The following summary is reproduced from the January Industry Report, Pulp and Paper:

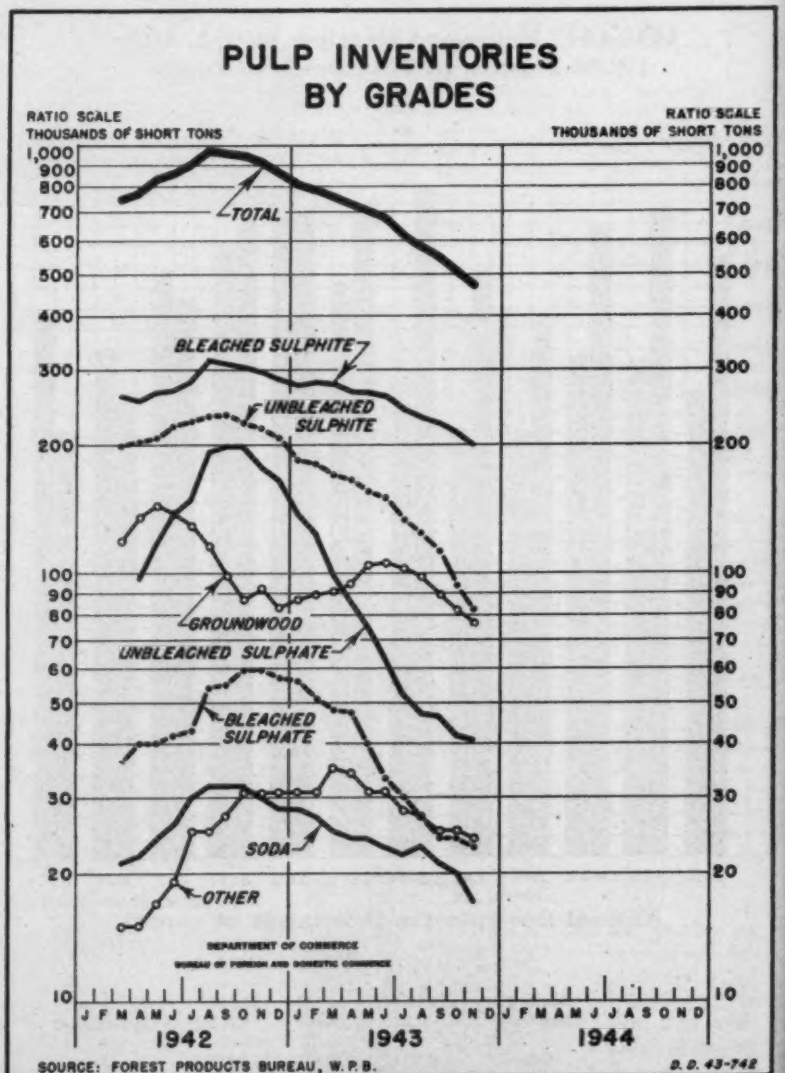
SUMMARY

Over a period of many months consumption of fibrous raw materials by the pulp and paper industry has been in excess of new supplies, resulting in a steady drain upon inventories. At the end of November, pulpwood stocks were 22 per cent below a year previous, while wood pulp inventories were down 49 per cent and waste paper off 58 per cent, in like comparison. The current inventory levels are critically low, particularly in view of the many uncertain factors relative to future new supplies.

The Forest Products Bureau of WPB has announced an over-all policy beginning with the first quarter of 1944 to allocate pulp for consumption in proportion to realistic estimates of new supplies of pulp and pulpwood so as to arrest the decline of already precarious inventory positions. However, anticipated total domestic wood pulp production for the first quarter of 2,568,000 short tons would require about 4,046,000 cords of pulpwood compared with estimated new receipts (including imports) of pulpwood of about 3,228,000 cords. Although it is realized that any accurate forecast of new pulpwood supplies is impossible, the current estimates, nevertheless, indicate consumption will exceed new supply by more than 800,000 cords for the quarter.

Pulp allocations for first quarter 1944 paper and paperboard production by principal grades have been adjusted according to estimated military and essential civilian needs. The minimum expected monthly average production of 1,398,837 tons of paper and board during the first quarter of 1944 is 2.3 per cent below the level of output in the third quarter of 1943. Substantial cuts have been made in printing papers, fine papers, and certain other classes, while increases are allowed for special industrial papers, container boards, building papers, tube stock, and a few other grades. This production pattern was determined from statements of requirements by the claimant agencies, coupled with mill reports of proposed consumption of pulp in terms of major end-use categories. Through increased use of waste fibrous materials and fillers and production of lighter weights of paper, mills are requested to produce maximum quantities from allocated wood pulp.

Production schedules for the first quarter allow for a ratio of 53 per cent



PAPER · · · America's 6th Industry

PAINT COMES IN PAPER CANS

(NEWS ITEM: The *newly-perfected "war emergency paint container" made of paper is saving tons of war-vital tin-plated steel daily.*)

Paper cans suitable for camouflage and black-out paints; and tank, gun and airplane finishes are giving as satisfactory service as metal cans. The body of the container is made entirely of cardboard impregnated with an insoluble substance.

The war conservation drive to save valuable metals has resulted in many new uses for paper. When the Victory is won, paper paint cans will no doubt continue to be used for such purposes as home and factory maintenance work.

The added war uses found for paper have greatly increased the responsibilities of the Pulp and Paper Industry. We are learning many practical and technical advancements that will result in greater improvements and more efficient equipment in our Post War Paper Making Machinery.

The improved Puseyjones Stream-Flow Vat Systems for Cylinder Machines give better formation, higher speeds, safer operation and greater profits. With the Stream-Flow Vat System you are assured of foolproof formation at top drying and driving speeds.

Puseyjones men and production facilities are on war work. However, since the WPB has declared the Paper Industry essential, we are in a better position to supply vital repair and replacement parts to keep present equipment operating efficiently.

Puseyjones engineers will welcome the opportunity to aid you with your post war problems. We have prepared three informative articles which are yours for the asking—"The Post-War Fourdrinier," "Development of Stream-Flow Vat System," "The Flow Spreader." Ask for reprints by name.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

Wilmington, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

paperboard and 47 per cent paper, compared with 45 per cent board and 55 per cent paper in the fourth quarter of 1942. This trend indicates the increasing use of paper products for direct and indirect war purposes.

To insure that the scheduled production of the various classes of paper and board is utilized for the most essential purposes, supplemental limitation orders on consumption will be issued as required. Additional restrictions have been placed on printing paper consumption by newspapers, magazine and book publishers, and commercial printers, bringing use down about 25 per cent below base periods. Use of paper and board in miscellaneous converted paper products has been further adjusted to reduce less essential consumption and allow for increases in some of the more essential civilian needs.

Since the primary problem of the industry continues to be shortages in fibrous raw materials, strenuous efforts must be continued to stimulate pulpwood cutting and waste paper salvage and collection. Concurrently, additional paper conservation measures must be carefully considered.

◆

IMPORT RULINGS ON CANADIAN PAPERS

Customs officials at various ports have decided several questions on the duty classification of paper imported from Canada. Paper claimed to be dutiable as printing paper at 1/5 cent per pound and 5 per cent was classified for duty as sulphite bond at 3 cents per pound and 5 per cent was classified supercalendered paper imported for use as book covers, believed by Customs officials to be dutiable as cover paper at 30 per cent was admitted as printing paper at 1/5 cent per pound and 5 per cent on the basis of opinions from domestic manufacturers. So-called victory kraft, containing 95 per cent sulphate fiber the balance other fiber, was classified for duty as wrapping paper not specially provided for at 25 per cent; it had been claimed dutiable at 20 per cent as kraft wrapping, but it was held that the Finnish trade agreement fixing the lower rate on such paper referred to the paper known as kraft in the American market at the time the trade agreement was negotiated. Lightweight paper from Canada, claimed to be book paper at 1/5 cent per pound and 5 per cent, was classified for duty as bible paper at 2 cents per pound and 10 per cent. In all of these cases the Customs officials acted on the basis of opinions secured for them by the Import Committee of the American Paper Industry from domestic manufacturers.

Washington News

MORE SOVIET PULPWOOD URGED ON LEND-LEASE

National interest has centered during the past month in the solution of the paper shortage problem by efforts from many quarters to develop means of securing the pulpwood necessary to keep American mills in reasonably normal operation.

The Boren subcommittee has urged President Roosevelt to secure a reverse of lend-lease shipments to Russia by securing the shipment from Russia to American mills of Soviet pulpwood. The request points out that ships carrying war supplies to Russia could readily come back with cargoes of wood instead of making the return trip empty. He said 16,000 cords had already reached this country by reverse lend-lease, and that President Roosevelt and Premier Stalin had discussed this problem at Teheran. At the committee hearing at which Mr. Boren revealed this development, E. W. Tinker, executive secretary of the American Paper and Pulp Association, said such a movement of wood may help tide us over the war period and prove an exceptional source in postwar years.

Canada has come to the aid of the American mills by authorizing an increase in the number of woods workers who will be permitted to leave Canada for work in the forests of Maine and New Hampshire. The quota originally allotted was 2,500, and this quota has been increased to 4,500. Recruitment by American mills, however, had not been able previously to secure even the number allowed under the original quota. Meanwhile, importation of Canadian pulpwood has been placed under War Production Board control. Canada has agreed to permit shipment of 1,250,000 cords in 1944, as against actual shipments in 1944 of 1,650,000 cords. Import control is established to permit the building up in this country of a reserve supply to meet unforeseen emergencies.

The War Production Board, the War Manpower Commission and the War Food Administration have issued a joint statement urging co-ordinated effort to get the wood needed, especially by encouraging farm woodlot operations, and James L. Madden in charge of pulpwood problems in the War Production Board has supplemented this appeal with figures to show the amount of wood that will be needed to keep the paper mills in operation.

Congressman Philip J. Philbin and Senator Ralph Brewster have introduced in the House and Senate respectively duplicate bills to place wood cutters and agricultural labor on the same basis as regards the deferment of such workers from the draft.

The labor stringency in the Pacific Northwest has been eased somewhat by the return to woods work of men formerly engaged in shipyard and other war materials operations. British Columbia is able to send increased quantities of hemlock unsuitable for lumber, but of pulp making quality, to the mills on this side of the border. Meanwhile a jurisdictional strike at a Rayonier plant has resulted in about forty pulp mill workers being inducted into the army, on the ground that having struck they are no longer exempt as engaged in essential war operations. The strike was not over wages but was a jurisdictional dispute.

FACTORS CONSIDERED FOR MORE PRINT PAPER

Factors which will be considered in handling appeals for additional print paper under the newspaper, magazine and book limitation orders in 1944, were announced January 14 by WPB Printing and Publishing Division. These factors are considerably more stringent than those which were considered last year.

Conditions which will be considered are set out in revised supplements covering future appeals for additional paper and include the following:

Newspapers: (L-240) Extraordinary growth of population in newspaper trading areas since January 1, 1943, requiring additional paper to maintain adequate service in communities, or other unforeseen circumstances which may be considered as undue hardships.

Magazines: (L-244) Unusual seasonal variations in publishing schedules requiring a redistribution of quarterly quotas; increased need for religious or instructional publications required by the Armed Forces, or any

Flexibility

Our 78 years of service to the Paper Industry have included more than one period when, despite raw material limitations, ingenuity has enabled us to keep our paper manufacturing and paper converting customers always supplied with high quality products.

Flexibility has continuously been our watchword. And so, although some of our standard starches, gums and dextrines may not be readily available at all times, our Paper Laboratories have developed alternate materials to serve the same purposes. Working with our field staff of paper technicians, our Paper Laboratories are ready to help you solve your sizing, calender, coating and adhesive problems.

78 YEARS OF STARCH SERVICE

STEIN SH HALL

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2601 SOUTH ASHLAND AVENUE • CHICAGO 8, ILL.
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LABORATORIES AT: NEW YORK
CHICAGO • CHARLOTTE • PROVIDENCE
LONG ISLAND CITY, N. Y.

FOUNDERS—STEIN • HALL RESEARCH FELLOWSHIP AT THE INSTITUTE OF PAPER CHEMISTRY, APPLETON, WIS.

unforeseen, unusual, extraordinary or emergency conditions which may constitute undue hardships.

Books: (L-245) Establishment of quotas for occasional publishers who do not use paper every year and who used none in 1942; as well as needs for Armed Forces publications, or any other unusual conditions similar to the magazine situation.

No grants of additional tonnage will be made to publishers who do not practice economical usage of paper or who could not meet requirements through paper conservation, it was pointed out.

▶▶▶ DEPUTY DIRECTOR OF the Paperboard Division of WPB is the new title of Russell W. Whitney, according to a recent announcement by G. G. Otto, director of the Division. Prior to his Washington appointment, Mr. Whitney, who resides in Montclair, N. J., was vice president of the Hinde and Dauch Paper Company of Hoboken, New Jersey. The appointment became effective January 15.

▶▶▶ CHIEF OF SPECIAL INDUSTRIAL PAPERS in the Paper Division of WPB is the position now held by C. J. Dynes, whose appointment follows several years of service in the sales department of The Sorg Paper Company of Middletown, Ohio.

▶▶▶ VICE CHAIRMAN OF WPB in charge of the smaller war plants corporation, and a member of the Board of SWPC, is an office to be held by Maury Maverick of San Antonio, Texas, according to an announcement by Chairman Donald M. Nelson. Prior to his new appointment, Mr. Maverick served as chief of the Government Division of WPB, which he organized shortly after WPB's inception.

AMENDMENT TO PENDING TAX BILL

A change in the interpretation of the Tariff Act to permit the duty free entry of lightweight newsprint has been effected by a conference committee of the House of Representatives and the Senate. On Friday, January 28, the conference committee agreed on the following as an amendment to the pending tax bill:

"So long as United States newspaper publishers are limited by law or by government order or regulation as to the amount of paper they may use in the publication of their newspapers, the term standard newsprint as used in Paragraph 1772 of the Tariff Act of 1930 shall be deemed to include paper weighing 30 pounds per ream of 500 sheets 24 by 36 inches with a 5 per cent manufacturing tolerance permitted, and also to include roll paper 15 inches or larger in width."

The passage of this amendment follows a series of conferences between newspaper publishers and representative domestic manufacturers. At first the publishers wished the manufacturers to agree to the weight limitation as given and to permit the free entry of paper down to a 14-inch width roll minimum. While these conferences were progressing, Congressman Boren introduced a bill which would not only include these provisions, but would admit paper duty free in as light weight as 25 pounds, and permit other deviations from the usual definition of standard newsprint. The domestic manufacturers were violently opposed to this proposal, especially at the 25-pound basis, which would throw open the American market to all grades of groundwood papers now dutiable. The publishers were unwilling to accept the industry proposal to restrict the change to the war emergency. Meanwhile, Senator Vandenberg introduced a duplicate of the Boren bill in the Senate, as an amendment to the pending tax bill. Eventually, as a result of joint efforts by the publishers and the domestic manufacturers, it was agreed to change both the Boren bill and the Vandenberg amendment when the tax bill went before a conference committee of the two houses, named to adjust differences between the House and Senate versions of the tax bill. The agreement on the terms given above was the result. There is little likelihood of any change when the revised bill goes back to both houses for final passage, and it appears that the revised bill will sufficiently meet the ideas of President Roosevelt and that he will not veto the measure. Mr. Roosevelt had asked for the Treasury tax plan to collect more than ten billion dollars and the bill now coming before the Congress cuts this estimate to well below three billion.

▶▶▶ AN EQUIVALENT INCREASE in the purchase of newsprint has been permitted Canadian publishers as a result of the 4 per cent "stretching" of raw material supplies accomplished by Canadian newsprint manufacturers, Paul Kellog, acting president of the Newsprint Association of Canada, announced recently. This saving was accomplished through the use of fillers, wastepaper, etc.

▶▶▶ A REVISION OF selective service regulations as applied to logging operations, makes it possible for workers within the industry to now move from one job to another upon completion of a specific operation. This can be accomplished by giving the necessary seven days notice and obtaining a permit from the selective service officer. Workers were previously frozen in their individual jobs.

NEW QUARTERMASTER SUBSISTENCE LABORATORY

▶▶▶ The new Quartermaster Corps Subsistence Research and Development Laboratory, 1849 West Pershing Road, Chicago, Illinois, was dedicated and formally opened January 8, 1944.

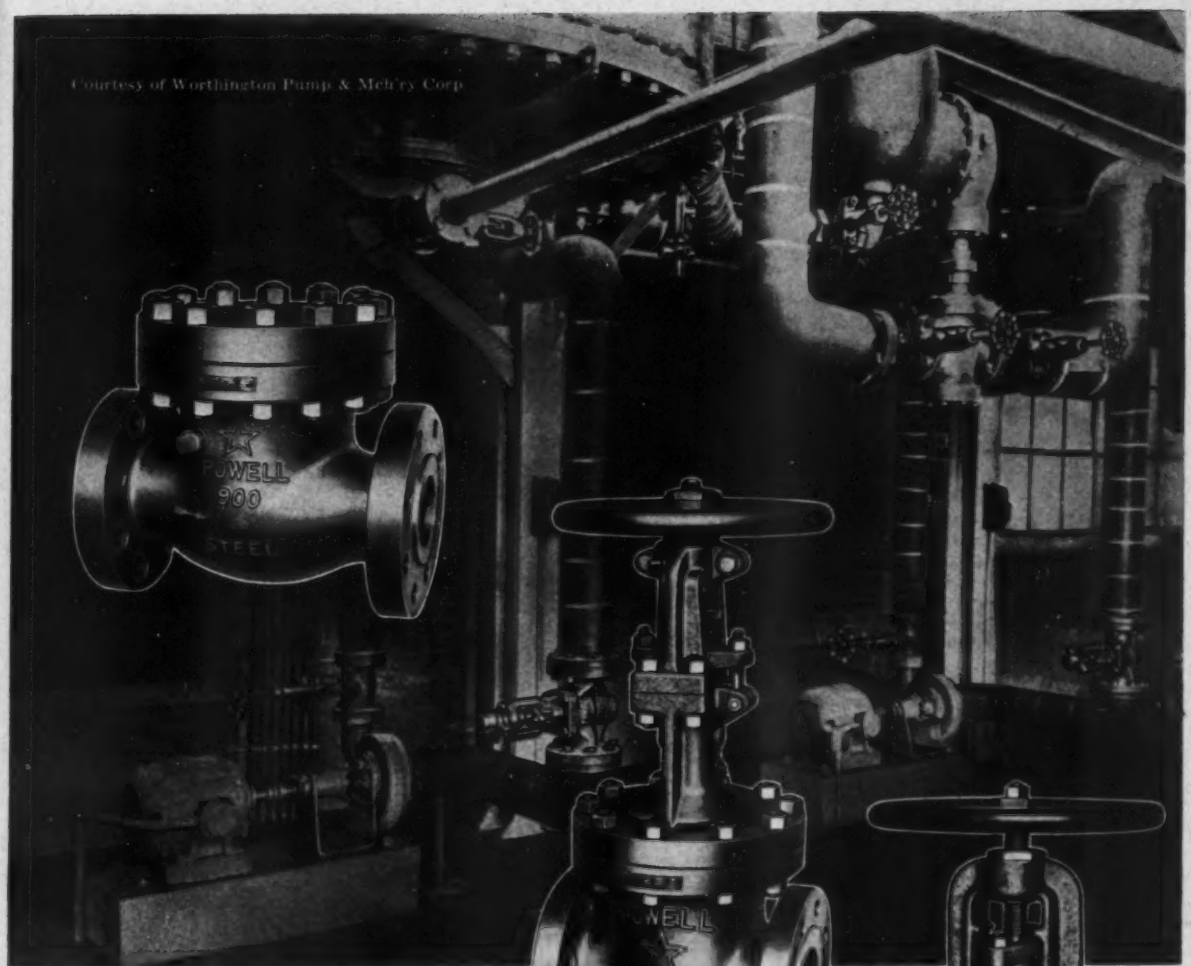
The new laboratory, which has been relocated at the Chicago Quartermaster Depot, has enlarged its floor space three-fold and has practically doubled its research staff. The additional civilian and military personnel and precision and testing equipment is expected to greatly accelerate food research. The laboratory is considered one of the most complete in the country and will conduct research and development of all foods contemplated for the Armed Forces.

Industry has awaited the announcement of the opening of the new and enlarged laboratory with a great deal of interest. Working closely with the laboratory's personnel, industry's laboratory staff and facilities have aided considerably in making it possible for the Quartermaster Corps to bring about new developments of food processing and packaging that already have proved beneficial to our fighting men. Naturally, much of the knowledge and information gleaned from this co-operative research will have far-reaching effects in the civilian food markets.

The new laboratory is an outgrowth of the Quartermaster Corps Subsistence School which began its first classes in the fall of 1920.

In June, 1936, the Subsistence School was merged with a general Quartermaster School at Philadelphia, and part of the technical library and equipment was transferred to Philadelphia.

On July 24, 1936, the school reopened in Chicago as the Quartermaster Corps Subsistence Research Laboratory. The laboratory was authorized to test foods and design modern packaging of foods, to prepare drafts of proposed specifications and modify those which became obsolete; to conduct studies and make analyses of various reserve and emergency rations or components thereof; to prepare informative bulletins and maintain liaison with other government agencies.



Ask POWELL for the Answer to all your VALVE requirements

Shown here are three of POWELL'S complete line of Steel Valves. These are especially suitable for ***steam*** or ***high pressure gas*** lines. POWELL Steel Valves are also available in both plain carbon steel and highly alloyed steels for ***process*** lines.

The photograph above shows POWELL Valves handling black liquor. Leading paper mills believe it wise to "ask POWELL for the answer to their valve requirements."

The Wm. Powell Co.

Dependable Valves Since 1846

Cincinnati 22, Ohio

Fig. 3003—Class 300-pound Cast Steel Gate Valve, with flanged ends, outside screw rising stem, two-piece bolted flanged yoke and taper wedge solid disc. Available in sizes 1¼" to 24" incl.

Fig. 9061 (top, left)—Class 900-pound Cast Steel Swing Check Valve, with flanged ends, and bolted cap. Available in sizes from 3" to 8", inclusive.

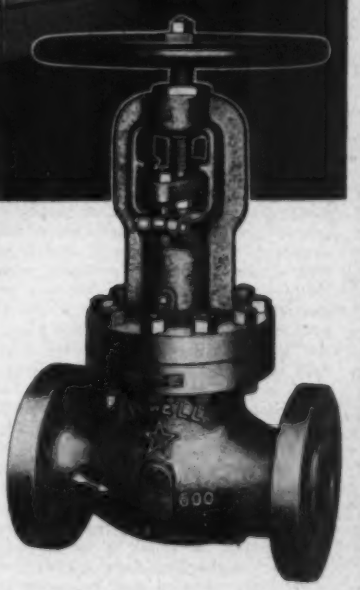


Fig. 6031—Class 600-pound Cast Steel Globe Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke bonnet and plug type seat and disc. Available in sizes 1½" to 12", incl.

POWELL VALVES

The critical period of 1940-41 found the laboratory at work on ration problems—the K ration; special Air Corps rations; combat and emergency rations —subsistence under all conditions. The newest ration developed in the laboratory is the versatile 10-in-1, a completely balanced day's food for 10 men, which can be divided into two complete 5-in-1 rations. In addition to these, many important laboratory research contributions have been made to the science of dehydrating and compressing foodstuffs, packaging, conservation, storage, transportation, in fact to every aspect of subsistence.

Foodstuffs to be sent overseas must be packed to withstand wind, rain, water, vapor, frost, Arctic cold, tropic heat, jungle moisture, desert dust, odors, grease, gas, rodents, insects and even light rays. To prevent loss of material due to defective packaging is one of the Quartermaster Corps' chief concerns.

Other angles of the tremendous task of producing wartime packaging were the problems of transportation by truck, ship, plane—in ratified atmospheres packages are submitted to partial vacuum—submersion in surf

***ABOVE**—Outstanding among the many items of new equipment installed in the new Quartermaster Corps Subsistence Research and Development Laboratory is the Humidity Room in which tropical climates can be duplicated. The room, designed to test packaging, is maintained at a temperature of 100 Fahr. and a relative humidity of 90 deg. Packaged rations are stored in this chamber for periods up to six months and the package must be in satisfactory condition before it can pass the tropical test. Lt. Robert deS. Couch, of the Packaging Branch of the Laboratory, is examining the effect of the humid, hot atmosphere on a case of Air Force Flight lunch . . . **CENTER**—In the Packaging Branch of the Laboratory, techniques are developed for the improved packaging and packing of subsistence items used in Army rations. Canned products are tested for endurance against rough handling and protection from moisture and freezing temperatures. One of the troublesome canned products for overseas shipment has been canned evaporated milk. Shown is Major James d'A. Clark, submitting ordinary commercially canned evaporated milk to a newly devised testing machine, which will probably cut the can open with one blow. At left is specially designed Army can for milk which has withstood fifty blows, the only result being a crumpled edge. The contents of the can remain perfectly sealed . . . **BELOW**—Water submersion tanks are among the many items of research equipment in the Packaging Branch, in the new Laboratory. Major Robert R. Melson, officer-in-charge of the Packaging Branch, is removing a "ten-in-one" ration from one of the tanks in which package rations are submerged for a given period of time, removed, and examined for deterioration.*

Welding Fittings of Stainless Steel

A decade spent in the fabrication of all kinds of stainless piping has led to the development of a line of Stainless Steel Welding Fittings by the Alloy Steel Division of Pittsburgh Piping and Equipment Company.

Tees, 45° and 90° Welding Elbows, Reducers, Caps, and Van Stone Welding Necks of Stainless Type Nos. 304, 316, 347, and other alloys are made in sizes ranging from 1" to 24" inclusive. Welded Stainless Steel Tubing is manufactured in sizes ranging from 4" and up, and in the alloys designated above, with wall thicknesses ranging from No. 12 gauge to ½".

The advantages of controlled shop prefabrication, which includes complete facilities for bending, welding, heat treating, machining, and testing, assures the quality and dimensional accuracy of your every stainless piping requirement.

For further information, contact our nearest representative or write us direct.

Pittsburgh Piping . *Back The Attack—With War Bonds*

AND EQUIPMENT COMPANY

10 Forty-Third Street · Pittsburgh · Penna.

Woolworth Building, New York · Occidental Building, Indianapolis · Peoples Gas Building, Chicago · Book Tower, Detroit
Public Square Building, Cleveland · 10 High Street, Boston · 525 Market Street, San Francisco

and storage on wet beaches in the open, where warehouses or docks are unknown. No matter how high the quality or great the quantity or heroic the hazards endured to deliver, food *must* arrive in good condition. And it *must* be protected with such a degree of perfection as to keep at least a year in spite of destructive elements.

Prior to Pearl Harbor, the Packaging Branch of the Subsistence Research and Development Laboratory, anticipating shortages in event of war, made shipments of foodstuffs to and from the tropics employing packaging materials hitherto not considered substantial, and a solid start toward discovering and using substitute materials had been made. Intensive study and exhaustive field and laboratory tests since have advanced the development of Army packaging to the point where it is now a high percentage meeting these myriads of unusual conditions.

In the Packaging Testing Laboratory are facilities for testing cartons and containers for submersion, moisture content, heat, cold, shelf life, odors, grease and many other kinds of trials a package might encounter. For example, the difference between a waterproof and a water-vapor-proof package should be clarified, as water-vapor is a gas and will pass through many materials that water will not, while the package may be watertight; if it is not water-vapor-tight, speedy spoilage may ensue. To provide a satisfactory barrier against water-vapor, it was necessary to develop a packaging film made from completely hydrophobic material. A process known as "breathing" from within; that is, expanding from warmth or contracting from cold, will introduce water-vapor into the package by the product which will eventually destroy itself.

Hundreds of such problems have to be met, to package food properly for this global war. Over one hundred fifty different materials for dehydrated vegetables alone have undergone severe tests for ruggedness to withstand impact and tumbling at low temperatures, a specification most difficult to meet, as has been proven by but five showing sufficient resistance to warrant use. In this case, the primary problem was to reduce moisture content, which would automatically reduce mold growth.

The cadelle, most dreaded and destructive beetle that attacks stored provisions, and which bores holes from sheer pleasure (it seldom eats what it finds) had to be combatted in desert and torrid temperatures. This insect drills through wood, foil, asphalt, practically everything but steel, but lately has been discouraged at encountering a ply of sandpaper incorporated inside the overall packing carton boards.

Research for asphalt flexible at cold temperatures, which will also withstand heat, has been difficult. In addition, the asphalt laminating agent has to be odorless. Dehydrated forms of foodstuffs has required development of gas packaging, as leafy vegetables are subject to oxidation. This means the oxygen in the container has to be removed and replaced by nitrogen or carbon dioxide.

Types of highly water-vapor-resistant sheets now employed to protect small packages are as follows: First, a metal foil, like lead, laminated to a suitable water-vapor-resistant cellophane or aluminum foil coated with a film of polyvinyl acetate. Second, a triplex sheet of glassine, laminated together with a total of about fifteen pounds per ream of amorphous wax; third, a duplex set of sheets of cellophane, laminated together with about fifteen pounds of wax per ream. Until recently the grades of cellophane used proved unsuitable for dry cold conditions. This has been overcome by careful selection of the type of cellophane used and in instances by modifying it.

While the Packaging Branch of the Quartermaster Corps Subsistence Research and Development Laboratory is rapidly solving many of the problems that confronted it at the beginning of the war, there is still much to be done. Procurement of plus-quality foods are not enough in view of the present type of warfare. Scientific packaging plays an ever-increasing part and new challenges present themselves every day. However, reports from actual battle fronts are conclusively proving that the laboratory is on the right track and more and more food is reaching destinations in perfect condition.

Participating in the dedication ceremonies were Major General Edmond B. Gregory, Quartermaster General of the United States Army, Major General Stephen G. Henry, charge of Subsistence Research for the Army Service Forces, Brigadier General Carl F. Hardigg, Subsistence Branch of the Office of the Quartermaster General; Brigadier General J. E. Barzynski, Commanding General of the Chicago Quartermaster Depot; Brigadier General E. L. Clewell, Commanding General of the Chicago Signal Depot; Colonel Georges F. Doriot, officer in charge of the Research and Development Branch of the Office of the Quartermaster General, Colonel Rohland A. Isker, head of the Quartermaster Corps Subsistence Research and Development Branch; Colonel Bernard J. Finan, Director of Procurement of the Chicago Quartermaster Depot.

In addition to the mlitary personnel, there were over sixty representatives from the country's leading food laboratories as well as over thirty leading administrators and executives from outstanding food manufacturing, processing and packing organizations.

NEKOOSA-EDWARDS BUYS LARGE AREA OF FOREST LAND

Approval of the sale of 45,117 acres of county-owned land to the Nekoosa-Edwards Paper Company, was voted January 6 in Rhinelander, Wisconsin, by the Oneida County board of supervisors.

Involving land in the towns of Minocqua and Hazelhurst, the sale was the largest in the county's history. It was announced that approximately $123,000 would be realized from the sale, the county netting about $64,000, and most of the remainder going to the towns.

The sale assured establishment of the Nekoosa-Edwards forest plantation, which will give Oneida County four major industrial forests, all operated by paper manufacturing firms. Other operators are the Tomahawk-Kraft Paper Company, the Rhinelander Paper Company and the Consolidated Water Power and Paper Company.

Approval of the sale was by a 20 to 7 vote of the county board, with the minority questioning the long range effect on the hunting and fishing rights of the public. It also was argued that the county should retain the land, managing it and marketing the timber in the same way as is done on industrial forest plantations.

◆

CANADA'S POSTWAR PLANS INCLUDE A RESEARCH INSTITUTE

Looking to future aid in the forest products industry, consultations are proceeding between federal and provincial governments relative to a $600,000 research institute at the University of British Columbia, Vancouver, B. C.

This project, which has been discussed for many years by leaders in the industry and by forest branch members, assumed definite form when postwar reconstruction programs were evolved. Groups interested in this phase of activity were represented by Premier John Hart, Honorable Wells

MARS PIPES THE TUNE

FASTER . . . FASTER . . . is the tempo of war. Your industry, too, is marching to the music of Mars. Busy brains are conjuring new products and specialties—creating difficulties which are aggravated by wartime shortages and limitations.

The results of our research and experience are available to help solve your *wartime* technical problems. Working together, we will gain in advance, profitable solutions to *post-war* problems. E. I. du Pont de Nemours & Co. (Inc), Organic Chemicals Department, Dyestuffs Division, Wilmington, Delaware.

Du Pont Dyestuffs

BETTER THINGS FOR BETTER LIVING THROUGH CHE

DU PONT DYESTUFFS

Gray, minister of lands; C. D. Orchard, chief forester; D. Roy Cameron, Dominion Forester in Ottawa, and Dr. L. S. Klinck, president of the University of British Columbia.

Under this program, the Canadian government (which already supports a forest products laboratory at the University) will build the institute and provide the machinery. Upkeep of the institute, which it is estimated will approximate $150,000 a year, will be absorbed jointly by the provincial government and industry.

◆

SERVICE MEN HELP OUT IN PAPER MILLS

In an attempt to solve a labor shortage problem in their Holyoke, Massachusetts, paper mills, American Writing Paper Corporation and Crocker-McElwain Company have turned to the United States Army. A number of service men at home on furlough or on leave from military duties have been working evenings in the AWP's Linden mill as laborers and helpers. These soldiers, for the most part, are stationed at the Westover Field army air base near Holyoke. They wear their uniforms while working in the mill.

Authorities at the air base point out that there is no army regulation forbidding service men from accepting such work in their spare time. However, furlough passes, or time off duty, are not allowed for the specific purpose of permitting soldiers to work off the post.

◆

▶▶▶ FORESTRY COULD PROVIDE enough postwar work to employ every available man in the province of New Brunswick, according to a brief recently forwarded to the New Brunswick Forest Products Association and the New Brunswick section of the Canadian Forestry Association.

◆

20 WASH. MILLS TO FINANCE RESEARCH PROGRAM AT U. OF W.

Twenty Washington State pulp and paper mills have agreed to contribute jointly from $300,000 to $500,000 to the University of Washington, during a five-year period, to finance a research program aimed at utilizing and neutralizing waste liquor from the mills.

The University's graduate school will be able to finance studies taking up the problem of waste disposal and studying commercial uses for waste liquor.

The mills plan to contribute a minimum of $60,000 annually, and have offered to raise the amount to $100,000 annually if advisable. Any patents developed from this work will be the property of the University of Washington Foundation for Research, with shop rights granted to the contributing mills. The research work will be administered by the graduate school's committee on lignin and cellulose research, which includes Dr. Guthrie, Professors H. K. Benson, B. L. Grondel, E. J. Ordall, George B. Rigg and H. V. Tartar.

◆

▶▶▶ A SWEDISH TRADE MISSION, named by representative Swedish industries to plan for a renewal of international trade between Sweden and the United States, has reached this country after a 27-day voyage. Among the delegates is Goesta A. Hall, representing Swedish pulp and paper mill interests. Mr. Hall states that his country hopes to be able to resume its normal exports of pulp and paper to the United States, and says that despite the war the nation has been able to build up its stocks of pulpwood to normal, and that mills soon will have on hand their customary tonnage of various chemical pulps.

◆

PACIFIC PAPERBOARD PLANS EXPANSION

An increase in output from 65 tons to approximately 125 tons per day by April 1, is anticipated by the Pacific Paperboard Company, Longview, Washington, according to an announcement by E. R. Flood, company president.

This extension program was made possible through assistance provided by the Small War Plants Corporation, and includes a recent addition to the beater room and plant warehouse, together with the installation of two new board machines purchased by the company a year ago.

◆

FLEMING AND SONS OF DALLAS, COMMEMORATE GOLDEN ANNIVERSARY

The year 1943 marked the close of fifty years of papermaking in the Southwest for Fleming and Sons, Inc., Dallas, Texas. Commemorating this golden anniversary the company has just presented its business associates with a handsome anniversary souvenir booklet.

Distinctly a work of art, this fine booklet is 12 by 9, done in letterpress on fine coated stock. The presentation of company personnel, views of its machinery and many exteriors, are told with photographs and the explanatory legends are brightened with color and a touch of gold.

Fleming and Sons, Inc., was established by John G. Fleming, who left Oregon, where he had grown up close to papermaking in the Northwest, and settled in Dallas. The family has carried on through four generations, manufacturing board, plain and fancy building papers, sheathing, cartons, etc.

◆

▶▶▶ AN OFFER OF $1,000 for the best suggestion leading to greater use of hardwoods in the manufacture of newsprint has been made by the Ontario Paper Company, Ltd. Conditions of the award will be announced later.

◆

▶▶▶ WOOD PULP PRODUCTION in British Columbia had a value of $16,200,000 in 1943 as compared with $14,900,000 in 1942.

◆

STOCK QUOTATIONS

New York Stock Exchange—Stocks

	Closing Prices Jan. 25, 1944	Dec. 31, 1943
A. P. W. Paper Co.	2¼	2½
Celotex	11½	11¼
Same Preferred	*17⅛–17½	17¼
Certain-teed	6	4¾
Same Preferred	61⅞	59¾
Champion P. & F. Co.	26½	23¼
Same Preferred	*110½–112	108
Container Corp.	20½	20½
Cont. Diamond	11½	11½
Crown Zellerbach	16¼	16¼
Same Preferred	98	98½
Dixie Vortex	15½	15½
Same "A"	44¼	44¼
Robert Gair	*3–3⅛	2⅞
Same Preferred	14¾	*13¾–13½
Gaylord Container	*13½–13¾	13½
Same Preferred	*51–52½	51
International Paper	14¼	14⅛
Same Preferred	68¾	69¼
Kimberly Clark	32½–33	32½
MacAndrews & Forbes	26¼–28	26¼
Masonite	39½	38
Mead Corp.	8½	8
Same Preferred	86	*79¾–82
Paraffine Cos.	47½	43¼
Same Preferred	106	*104–105⅞
Rayonier	13¼	13½
Same Preferred	30	29
Scott Paper	*39¾–40	39½
Same 4½% Pfd.	109½–110	*111–112
Same 4% Pfd.	108¾	*108–110
Union Bag & Paper	9⅝	9⅜
United Paperboard	4¼	.....
U. S. Gypsum	74	73
Same Preferred	*169–172	170

New York Stock Exchange—Bonds

Abitibi 5%	72⅜	.....
Celotex 4½%	.....	.....
Certain-teed 5½%	100⅜	100¼
Champion P. & F. Co. 4½%	.....	.....
International Paper 5%	104⅛	.....
Same 6%	.....	106½

New York Curb Exchange—Stocks

Am. Boxboard	.....	6
Great Northern	.....	30
Hummel Ross	4⅜	4
St. Regis	4½	4⅜
Taggart	.....	5
United Wall Paper	2½	2½

*Closing Bid and Asked Prices.

Here's the "Doctor"

to cure Production Wastes!

Check

THESE APPLICATIONS

Here are just a few of the temperature points where use of Foxboro Temperature Recorders may point out important savings:

PAPER STOCK LINES	BEATERS
DRYERS AND OVENS	GRINDERS
CHLORINE LINES	DIGESTERS
ACCUMULATORS	BLEACHERS
CONDENSERS	SIZE TANKS

Unsuspected temperature fluctuations may be wasting your time, fuel and materials . . . causing needless losses in efficiency. Daily records of these temperatures will show just where the wastes occur . . . enable speedy "diagnosis" and correction!

You can get these records, continuously and inexpensively, with recording thermometers. By specifying Foxboro Temperature Recorders, you'll make sure of getting them *accurately and dependably!*

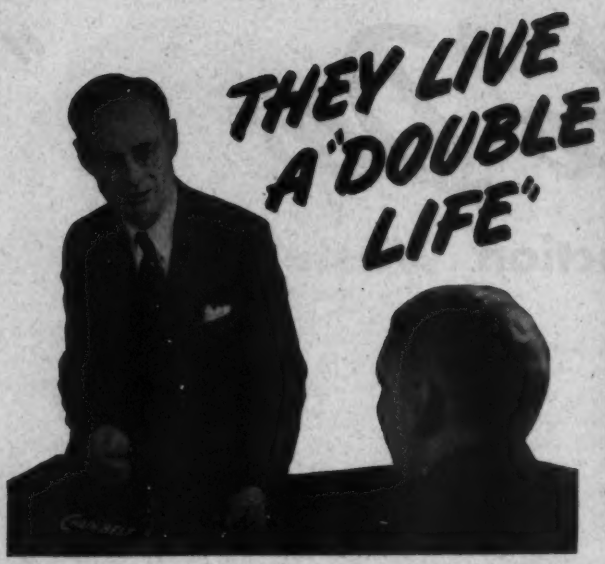
Foxboro Temperature Recorders are precision-engineered to meet toughest industrial needs for accuracy, endurance and trouble-freedom. Their ultra-sensitive thermal system reacts instantly to slightest temperature changes. Their light, strong recording mechanism "writes it down", day-in, day-out for years without maintenance!

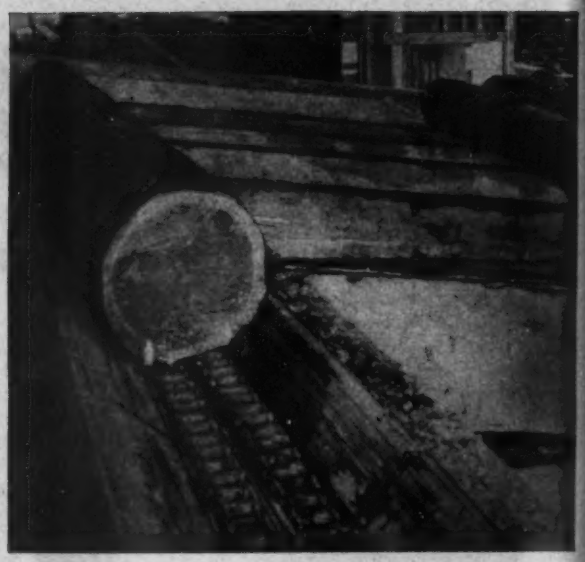
Write for Bulletin 198-2 containing the full story of these automatic aids to waste-elimination. The Foxboro Company, 158 Neponset Avenue, Foxboro, Mass., U.S.A. Branches in principal cities of U. S. and Canada.

FOXBORO

REG. U. S. PAT. OFF.

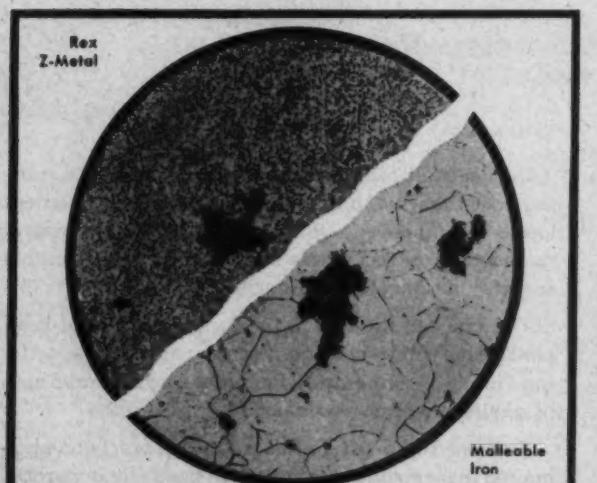
TEMPERATURE RECORDERS



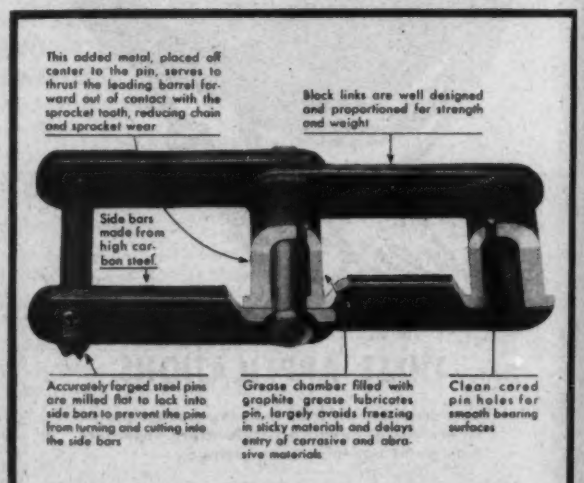


❶ **"DOUBLE AND THEN SOME!** Why, in mill after mill, Rex Z-Metal chain belts have operated more than double the life span of ordinary chain belts. In dusty, moist or corrosive operating conditions, they can't be beaten for economical, trouble-free service."

❷ **"Z-METAL'S THE ANSWER** where loads are extra heavy or where corrosive conditions are a problem. Just note this installation photo. Grueling service such as this lumber mill log conveyor has to take, is child's play for Rex Z-Metal chain belts.



❸ **"THIS PHOTOMICROGRAPH** (200 X magnification) clearly indicates the uniformity of Z-Metal's grain structure. The small spheroidal particles in the Z-Metal are iron carbide. They and their relation to each other impart the greater strength and hardness to Rex Z-Metal."


This added metal, placed off center to the pin, serves to thrust the leading barrel forward out of contact with the sprocket tooth, reducing chain and sprocket wear
Block links are well designed and proportioned for strength and weight
Side bars made from high carbon steel
Accurately forged steel pins are milled flat to lock into side bars to prevent the pins from turning and cutting into the side bars
Grease chamber filled with graphite grease lubricates pin, largely avoids freezing in sticky materials and delays entry of corrosive and abrasive materials
Clean cored pin holes for smooth bearing surfaces

❹ **"AND FOR REAL TOUGHNESS,** combine the strength of Z-Metal with the features of Rex Durobar chain belt, a big favorite in the lumber industry with its famous off-center design and reinforced barrels. It's even more popular when cast in Z-Metal."

* * *

Rex Z-Metal chain belts are the answer to any drive or conveying problems involving heavy load or corrosive conditions. The Rex Man can help you with your chain belt application problems. For chain belt engineering data ask for the 768-page catalog No. 444. Chain Belt Company, 1717 West Bruce Street, Milwaukee 4, Wisconsin.

REX CHAIN BELTS

More than 2000 sizes and types for the positive transmission of power, timing of operation and conveying of materials

CHAIN BELT COMPANY OF MILWAUKEE

Rex Conveying and Engineering Products Division, Rex Chain Belt and Transmission Division, Milwaukee, Wis. · Baldwin-Duckworth Chain Belt Division, Springfield, Mass.; Worcester, Mass.

Help for hard-pressed teeth

• FOR HIGH external temperatures combined with heavy tooth loads, high load peaks or shocks, and also for exposed locations with extreme variation of external temperature, a leading gear manufacturer specifies the use of extreme pressure lubricants. This recommendation is in line with much of our experience.

These lubricants provide a load-carrying capacity many times that of straight mineral oils. They prevent scoring and galling of teeth when pressures are too great for protection by ordinary oil film. In the top flight of this type of product are Stanogear Leaded Lubricants. These lubricants have an endurance far beyond that of the usual E. P. lubricant, and therefore require changing much less frequently. Here are typical examples of the results they give:

Stanogear more than match for trouble-maker. Excessive wear and scuffing were troubling a midwest battery plant using a set of large, broad herringbone gears to drive a zinc rolling mill. Pressures were high, there was considerable shock load, gears ran very hot.

A number of makes of lubricants were tried without correcting the trouble. Then a Standard Lubrication Engineer was called in. He recommended Stanogear Leaded Lubricant No. 6X because it lubricates the teeth in spite of high pressures and results in lower gear temperatures. Also, it is highly stable and does not form the excessive deposits sometimes associated with the use of such products.

To make doubly sure, the Engineer recommended spray application at the point of contact, resulting in further temperature reduction. These recommendations were adopted over a year ago, and the manufacturer has enjoyed trouble-free operation ever since.

Herringbone speed reducer. This type of unit may be subjected to high external temperatures, combined with high peak or shock loads. Prevention of excessive wear may require use of high quality extreme pressure lubricants, such as Stanogear Leaded Lubricants.

Again Stanogear to the rescue. Here's another case of trouble going out when Stanogear Leaded Lubricant came in: A central west metal working plant was having excessive wear on a three-speed transmission driving a cut-off saw, and involving a chain of gears in an enclosed case. The oil level at the lower end of the case was only about three inches deep and there was a vertical lift of approximately 16 inches to the top gear. Several gear replacements had been required during an eight-months' period, using a conventional S.A.E. No. 90 automotive gear lubricant.

When a Standard Lubrication Engineer was called in, he recommended Stanogear Leaded Lubricant No. 3X. Its excellent load-carrying characteristic provided positive lubrication, with the result that there has been no evidence of excessive wear in about 18 months.

How to get help quickly. If you are having any trouble with power transmission equipment, let a Standard Engineer help you keep it doing its full wartime job. He has a complete line of lubricants which meet the many and varied requirements of this type of service. He also has had experience with ironing out difficulties with the same kind of equipment you use in your plant. For the Engineer nearest you, phone or write the nearest Standard Oil (Indiana) office, or 910 South Michigan Avenue, Chicago, Illinois. In Nebraska, address any Standard Oil Company of Nebraska office.

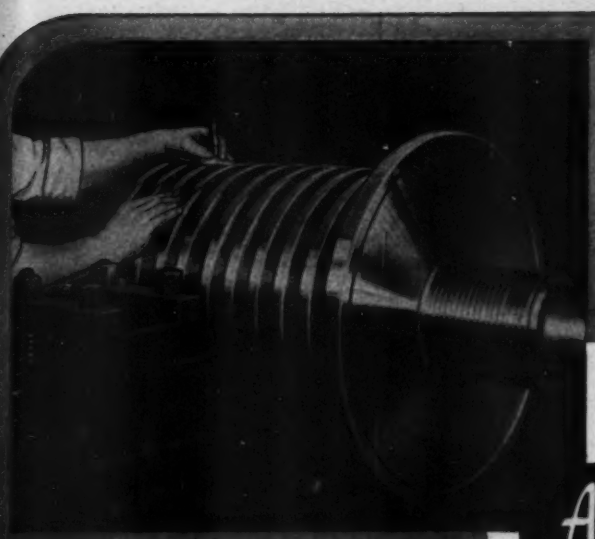
Oil is ammunition . . . Use it wisely

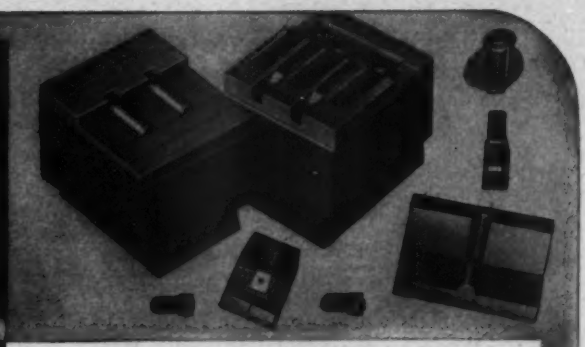
STANOGEAR
LEADED LUBRICANTS

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATI

1
APP-WELD
PATENTED
SEAMLESS
JOINT
MONO-PLANE
SMOOTHER SURFACE-LONGER LIFE
weave
U.S. PAT. NO. 2043773
2
APPLETON
TRADE MARK
PHOSALOY
WIRES
THE STANDARD OF QUALITY
3
4
Four things to remember when buying Wires
★
APPLETON WIRE WORKS INC.
APPLETON, WISCONSIN
4
Appleton Wires are Good wires





Special tools, gages, jigs and templates used in the production of the integral steam turbine rotor shown.

A Manufacturing Policy THAT HAS STOOD THE TEST OF TIME

From its inception in 1901, the De Laval Steam Turbine Company has recognized that the best results are obtainable only by confining the work of its staff to the development, design and production of a single class of manufacture, having the same general characteristics and requiring the same processes and high grade of workmanship. Consequently the efforts of the company have been confined to high-speed rotary power equipment, including STEAM TURBINES, HELICAL and WORM SPEED REDUCING GEARS, CENTRIFUGAL PUMPS and COMPRESSORS and ROTARY OIL PUMPS.

The jigs, tools and gages required for the production of high-grade work are much more expensive and elaborate than are those necessary for work requiring less refinement and care in manufacture. Also, the type of shop employee who can perform this accurate work is entirely different from that required for less particular and accurate classes of work.

M-29

De Laval STEAM TURBINE CO.
TRENTON 2, N.J.

MANUFACTURERS OF TURBINES . . . STEAM, HYDRAULIC; PUMPS . . . CENTRIFUGAL, CLOGLESS, ROTARY DISPLACEMENT, MOTOR-MOUNTED, MIXED-FLOW, PROPELLER; PRIMING SYSTEMS; CENTRIFUGAL BLOWERS and COMPRESSORS; GEARS . . . WORM, HELICAL; and FLEXIBLE COUPLINGS

...what's YOUR quota?

...YOUR 4TH WAR LOAN QUOTA

WHETHER your plant meets its quota, or fails, lies largely in *your* hands. Your leadership can put it over—but if you haven't already got a smooth running, hard hitting War Loan Organization at work in your plant, there's not a minute to lose.

Take over the active direction of this drive to meet —*and break*—your plant's quota. And see to it that every one of your associates, from plant superintendent to foreman, goes all-out for Victory!

To meet your plant's quota means that you'll have to hold your present Pay-Roll Deduction Plan payments at their all-time high—plus such additional amounts as your local War Finance Committee has assigned to you. In most cases this will mean the sale of *at least* one $100 bond per worker. It means having a fast-cracking sales organization, geared to reach personally and effectively every individual in your plant. And it means hammering right along until you've reached a 100% record in those *extra* $100 —or better—bonds!

And while you're at it, now's a good time to chec those special cases—*growing more numerous ever day*—where increased *family* incomes make po sible, *and imperative,* far greater than usual inve ment through your plant's Pay-Roll Deduction Pla Indeed, so common are the cases of two, three, even more, wage-earners in a single family, that you do well to forget having ever heard of '10%' as a re sonable investment. Why, for thousands of thes 'multiple-income' families 10% or 15% represents b a paltry fraction of an investment which should b running at 25%, 50%, or more!

After the way you've gone at your wartime *pro duction* quotas—and topped them every time—you' certainly not going to let anything stand in the way o your plant's breaking its quota for the 4th War Loa Particularly since all you are being asked to do is t sell your own people the finest investment in th world—*their own share in Victory!*

LET'S ALL BACK THE ATTACK!

This space contributed to Victory by

The Paper Industry and Paper World

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council.

There is a size and type LOUIS ALLIS electric motor for every industrial requirement.

THE LOUIS ALLIS CO., MILWAUKEE 7, WIS.

The War is not Won—Yet!

A few robins don't make the summer — and neither do a few victories — as important as they are — mean that the war is WON!

From December 7, 1941 we have come a long way — a modern miracle in war production and military achievement has been performed.

Important victories are being chalked up for our side — we are taking the offensive and the initiative, but we have a long, long way to go before the war is definitely and finally WON!

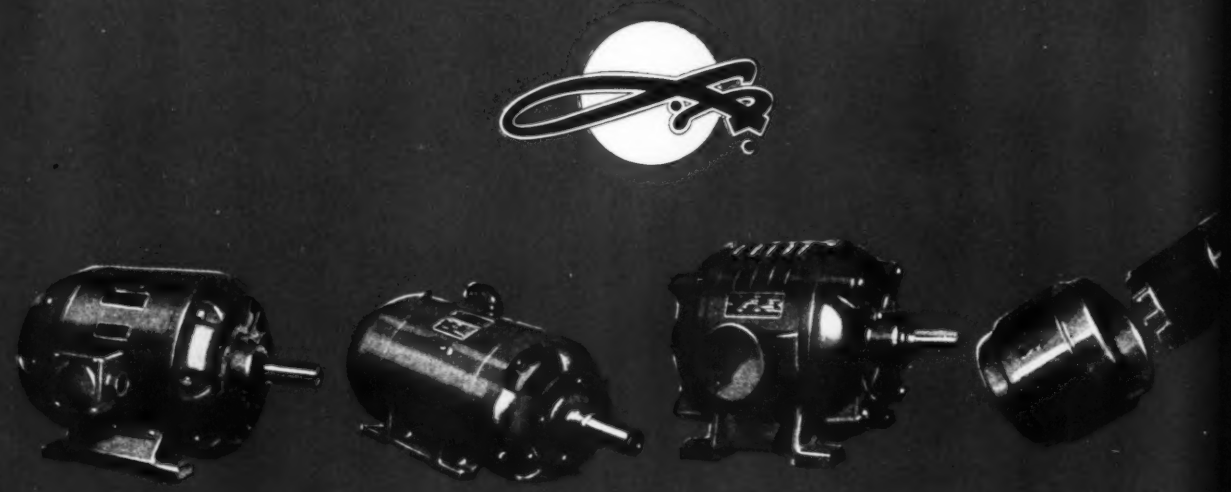
To let down in our efforts now — even the slightest — will be a tragic mistake that will be paid for by the warm life-blood of our sons.

We here at Louis Allis are redoubling our every effort in every way to help win this war — to get it over as quickly as possible.

★

If you are planning a post war product that will require a special electric motor in its construction, our engineering development department will welcome the opportunity of working with you — just as soon as Uncle Sam does not require our full capacity.

THE LOUIS ALLIS CO., MILWAUKEE 7, WIS.



Built of Steel Saved by Paper

Every day in some new way paper is taking over the work of steel, tin, copper, zinc, aluminum—freeing millions of pounds of precious metals for the tools of war.

Forty thousand tons of steel saved in packaging tobacco; sixty thousand tons saved in packaging dog food; ten thousand tons saved on frozen foods and thirty thousand tons on dehydrated foods for government purchase alone! These savings on just four items are releasing enough steel to build 2,300 60-ton tanks—a veritable armored army.

And this is only the beginning. The essential paper industry is finding countless ways in which paper can substitute for metal; do its job as well or better; save money, weight, shipping space; help to win the war.

KENWOOD WOOL PRODUCTS

F. C. HUYCK & SONS

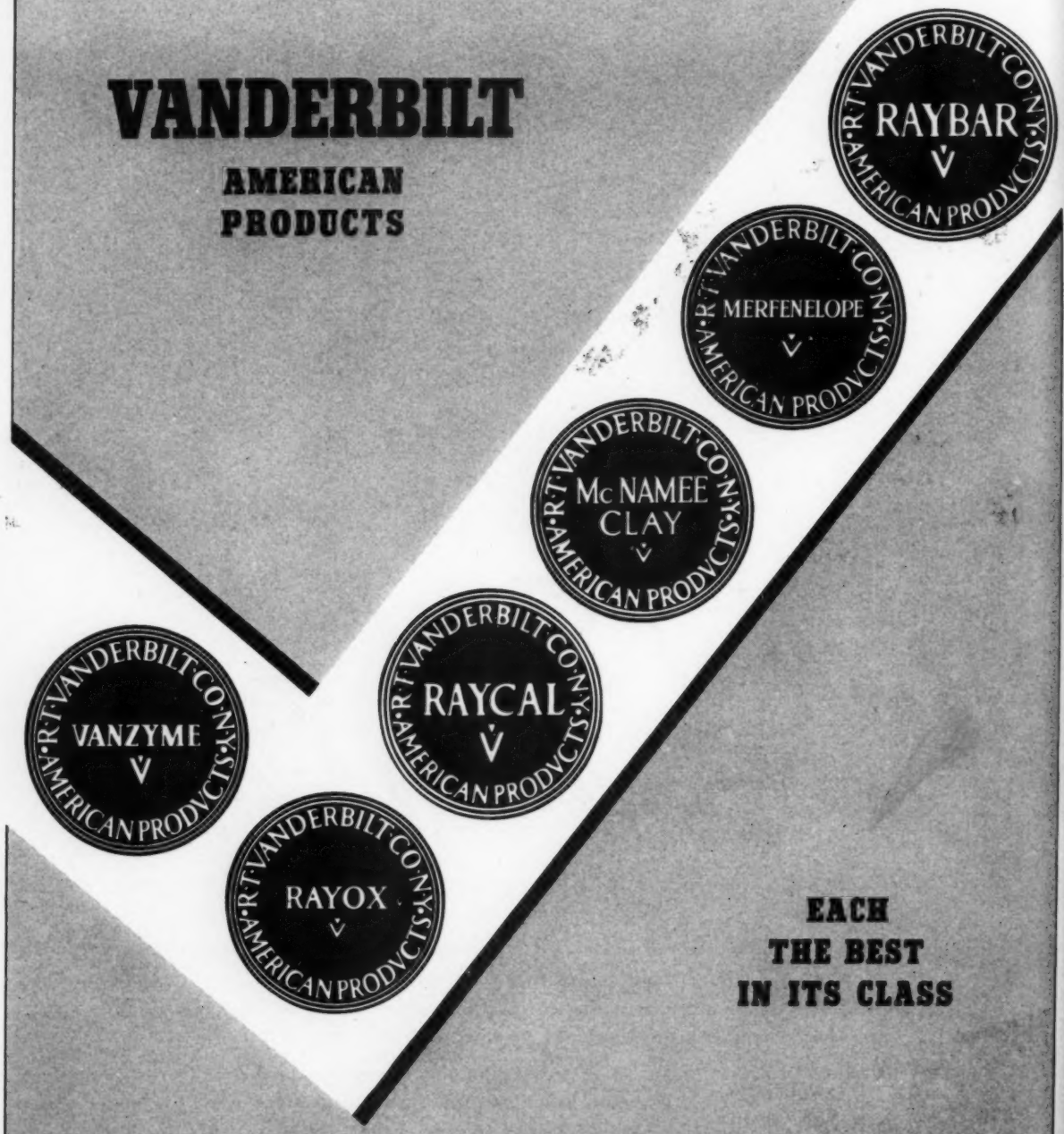
Kenwood Mills

Albany New York

F. C. Huyck & Sons is proud to be serving an industry so essential to the war program. Our skill, our facilities and our 72 years of experience are always available in solving the special felt problems created by urgent wartime paper needs.

VANDERBILT

AMERICAN PRODUCTS



EACH THE BEST IN ITS CLASS

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York City

The Paper Industry and Publicity

▸▸▸ THIS YEAR WILL WITNESS the crisis in the paper situation. Scarcity of paper for public consumption exists here and now.

The war effort will not suffer for want of paper. The Government will take and is taking (as it should) all of the paper products it needs. The War Production Board, on the other hand, has made and is making strenuous efforts to keep the public supplied, as are other agencies which have been set up to promote the cutting of pulpwood and to increase the collection of wastepaper.

These efforts have been supporting the paper industry's needs with intensive publicity. For the first time in many years, the public probably is becoming paper conscious. Paper, pulpwood, and wastepaper are being talked about as never before. There is a growing realization that paper products are essential and indispensable commodities to the War and to the domestic economy of the nation.

Today the fibrous raw material situation is not nearly so gloomy as it appeared to be only a few months ago. The wastepaper salvage program seems to be going along nicely; and, as far as pulpwood is concerned, domestic receipts for each of the three months of October, November, and December, of 1943, exceeded the receipts of the corresponding months of 1942. According to the War Activities Committee of the Pulpwood Consuming Industries, the 1,400 newspapers and farm magazines in pulpwood producing areas, which formed the nucleus of the Victory Pulpwood Campaign of last year, and are now pushing the 1944 drive for 14,000,000 cords of domestic pulpwood, are chiefly responsible for this upturn.

With these war emergency programs under way, the public undoubtedly will learn even more about the papermaking industry—it will become more conscious of the importance of paper to the well-being of the nation. In a general way, the public may awaken to some of the problems of paper production.

If the paper industry is to meet the wartime demands being made of it, that industry must have fibrous raw materials in sufficient volume to supply those demands. The industry is confident that the public (when fully informed of this vital need) will cooperate to the fullest to assure a sufficient and steady supply of vital raw materials.

Support the 1944 Red Cross War Fund

▸▸▸ PRESIDENT ROOSEVELT has designated the month of March as Red Cross Month. In those few weeks, the American Red Cross is to raise its 1944 War Fund. A goal of $200,000,000 has been set for the drive—a sum of unprecedented size to meet unprecedented needs.

Last year, with the co-operation of industry, agriculture, various organizations and associations, as well as many individuals, the Red Cross completed the busiest year in its history. On the war fronts and at home, it served the Armed Forces faithfully. It also served civilians in many parts of this war-ravaged world equally well.

In its service to prisoners of war alone, the Red Cross shipped nearly 60,000,000 pounds of food during 1943. This tremendous quantity of food was done up in 8-pound parcels, thus more than 7,400,000 such parcels were made. The contents of the parcels included processed meats, cheese, powdered milk, fats and butter substitutes, dried fruits, biscuits, candy, dehydrated soup, powdered coffee, smoking tobacco, cigarettes, and soap.

During 1944, the Red Cross must supply some 5,000,000 blood donations, and must recruit 2,500 nurses a month for the Army and Navy. It must maintain field directors and other trained personnel at military and naval posts and hospitals to help both our fighting men and their families. Then, too, at home, it must be on the alert to meet disasters should they occur. It must train nurses' aides and first aiders. It must continue its educational work. Food parcels for distribution to prisoners of war must be packed. Surgical dressings must be made. (More than 900 million surgical dressings were made during 1943.)

Attention also must be given to the thousand and one details of administration of this far-flung organization.

There must be no letup in the work of the Red Cross; this work must go on—possibly even be expanded—to meet new situations.

Since all of this work is made possible only by voluntary gifts and contributions, give all the support that you can to the 1944 Red Cross War Fund appeal. Remember, the Red Cross needs you, and you need the Red Cross.

Current Thought . . . . WILLIAM SIBLEY

Look Here, Mr. Striker!

▶▶▶ THE AUTHOR OF the article I am quoting below is Kenneth Walsh, a sailor aboard a warship somewhere in the South Pacific. The story was first published, only recently, in his hometown paper, the *Muncie* (Indiana), *Press* after which it was distributed nationally by the NEA Service. It is a piece that should be read by every civilian in America, and I find pleasure in passing it along to you. Doubtless you will want to help perpetuate it by re-publishing it in your house organ.

"I want to show you a bit of hallowed ground—it is the Arlington Cemetery of the South Pacific; it is the Valhalla of American servicemen. I'm going to show you this bit of ground, but it will be done the hard way. Come with me up Sealark Channel at dawn of a day in August.

"Yes, Mr. Striker, I want you to stand at the rail with these men, nerves drawn as taut as a violin string—mouths dry, eyes strained to the breaking point, breath coming in short gasps of fear—that awful feeling of nothingness in the pits of their stomachs. The objective comes into view, the time has come for these men to step out on the stage, and they know full well that death plays the leading role in this theater.

Death Is Their Destiny

"There they go over the side of the big transport—Tom Jones, Dick Brown and Harry Smith. Hand-over-hand they crawl down the cargo nets into their small craft that is to take them to a rendezvous with that death. You know it's death—it is in the destiny of these men.

"The first objective is reached—the cocoanut grove at the water's edge. Men are down never to rise again, other men move up to take the places of the fallen. The main objective is an air field beyond that fringe of cocoanut trees, and as though God Himself has pulled the curtain on this brutal stage, their movements become vague and finally obliterated and these movements become lost to you. The uncertainty, the utter feeling of helplessness leaves the element of time suspended in the hellish hot sun of the tropics.

"Close your eyes, Mr. Railroad Worker, close them tight; it is another day, in another month; your hands are gripping another rail, the inevitable cocoanut tree rail that separates the living from the dead in these areas of war. You can open your eyes now, Mr. Coal Miner, open them wide. Yes, the seeds that have been planted have grown into bloom; the bloom is the row upon row of white crosses that meet the eye. These men have paid the price in full for just seven small acres of ground, but seven of the most important acres of ground ever owned by Uncle Sam.

"Restful, isn't it, peaceful and quiet—yes, quiet with eternal peace. Read the epitaphs, Mr. Labor Leader, they tell a story in themselves—America, the Land of the Free. There's a Star of David beside a pair of rosary beads owned by some Irishman. A captain of marines and a colored boy from Georgia sleep side by side—a lieutenant from Indiana, a sailor from North Dakota, an aviator from Ohio, from here, from there, from every star in the flag, a cross in the ground. Tom Jones, Dick Brown, Harry Smith. It's their home now, some 7,000 miles from home. These men were making $50 a month, Mr. Striker, $50 a month, room and board.

No Strikes Here

"When you were a kid, Mr. Striker, you studied about the American heritage of 'life, liberty and the pursuit of happiness.' Well, read it again and then again; study it; delve back into the pages of American history and show me anything in the American creed of living that will justify your wartime strikes.

"Come out here with us in these South Pacific waters and stay a while. Eat our chow, sleep in our sacks, watch us work, help us fight these jungle flies, help us kill malaria-bearing mosquitoes. Walk with us through the mud and the slime of the swamps of these jungle islands; walk with us in the sweltering, steamy heat of a noonday sun. There isn't any air-conditioning out here, Mr. CIO, and there isn't any way you can strike for it, either. You haven't even the time to think about it.

"Come with me to the bridge over the jungle river. I want you to see someone who would make you ashamed of that extra 50 cents an hour you get in your pay envelope. He's just a 17-year-old kid that the brass hats put on duty at this infrequent bridge for the simple reason that he isn't sure of himself any more. Did I hear you ask what's wrong with him? He was on a destroyer that took three 'fish' amidship and blew up, Mr. Twenty-Dollar-a-Day-Man. His brother was on that ship too. There were but a few survivors from a crew of 300, and his brother was not among them. He's plainly shell-shocked. Talk to him a while, watch him; he'll break your heart, man, if you have one. Did you ask me how much money he makes? It's $50 a month, Mr. Welder—$50 a month, room and board.

Why He's Left-Handed

"And here's a guy I want you to meet—a left-handed Marine. What's so remarkable about that? I should make myself clear? He's learning to be a left-handed Marine. A Jap slashed off his right hand at the wrist as he was climbing out of a foxhole on Guadalcanal. He is making $50 a month, room and board. Ask him how near-sighted the Jap is reputed to be. He'll tell you that in a morning check-up no less than 25 of his buddies were found dead at their posts, shot through the head, Mr. Slacker. Found 7,000 miles from home in a God-forsaken hole on a God-forsaken bit of land. Not very nice to hear about, is it? But it's the brutal truth. Think about it the next time you sit over a big steak dinner in your comfortable home.

"See that boy sitting over there on that hatch cover, Mr. A. F. of L.? He's only 22—just a boy, maybe the one that lived down the street from you. He looks down in the mouth, doesn't he? Why shouldn't he? Some time this week his wife is going to have a baby, but he's not going to be there when it happens. He has to stay out here for the duration . . . 'Wonder if it's a boy or a girl; hope it's a boy. I wonder if my wife is well. Please, God, she doesn't die—she can't die—I've got to get home.' Fifty dollars a month, Mr. Steel Worker, $50 a month, room and board.

"A ship today is bringing in a cargo of human suffering. Come down to the quay with me and witness the transition of young America.

Welcome to Wounded

"The men on the wharf become tense, the music has a sound to it that is of the infinity as all eyes are strained toward the slowly descending gangway. The first man of these thousands of battered troops tortuously feels his way to the ground, the band strikes up 'The Star-Spangled Banner' as soldier after soldier follows in his wake.

"But what is this? What is wrong? These men have to be led! They aren't sure of themselves as they stumble and fumble their way to solid ground. John L. Lewis, look into the eyes that are open, but see not. Watch lips that move, but say nothing. Look at the stumps dangling from their bodies that once were arms and legs. Look into the souls of these shell-shocked, fear-ridden, malaria-sick men that are not men, but sacks of skin and bones. Nerves gone, minds temporarily deranged, bodies numb from being stretched on the searing rack of war.

$50 a Month

"But stay a while, Mr. Striker, don't leave me now! Do you hear the bugle in the far distance blowing taps? It has an unearthly sound and it is for the unearthly that it is being played. The big boom on the hospital ship swings downward and picks up the last of her cargo—the wicker baskets of the dead.

"Look around you, man. Those are tears you see in the eyes of these hard-bitten veterans as they watch the baskets being lowered to the dock and draped with the flag for which the dead have given their lives.

"Yes, Mr. War Plant Striker, these men were getting $50 a month—$50 a month, room and board."

KEEP AN EYE ON TOMORROW

Have you an eye fixed on the peacetime ahead? Will you be ready to cope with the keen competition that will arise through more efficient production at a lower cost? You are bound to need new stock preparation equipment. For obsolete machines will not be able to meet the challenge of better quality paper demands. Many paper makers are now fully alert to the problem of peacetime change-over of machines. That is why we suggest that you, too, keep an eye on tomorrow. A Jones sales engineer will be pleased to tell you about the many advantages of Jones Products that you will need for your post-war requirements.

Jones

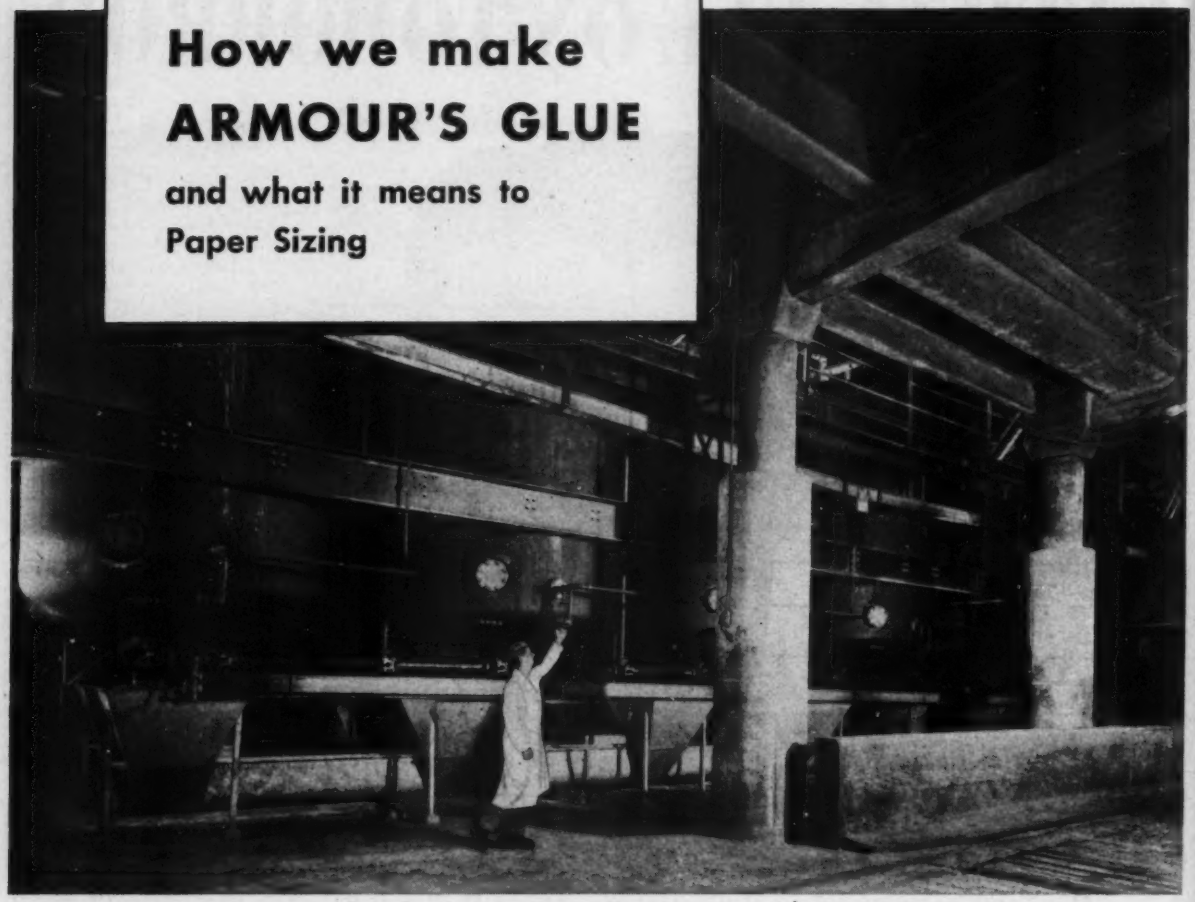
GEARED FOR WAR PRODUCTION

E.D. JONES & SONS COMPANY-PITTSFIELD, MASS.

Builders of Quality Machinery for Paper Mills

How we make ARMOUR'S GLUE

and what it means to Paper Sizing



These Pressure Cookers Extract the Glue Liquors

These are only a few of the many giant pressure cookers in which the pure glue is extracted from raw materials for Armour's bone glue.

Under regulated pressure, the freshly washed stock is processed to convert the collagen into glue. The stock is cooked not once . . . but several times. And after each "cook", the resultant glue liquor is drawn off.

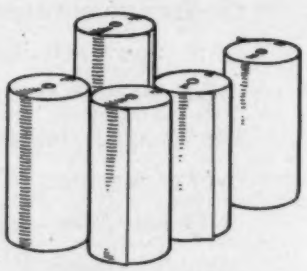
It is this series of "cooks" which enables Armour-to make so many different grades of glue . . . so many blends of glue to meet specific needs.

And the high quality of Armour's glue results from the rigid controls of the extraction process. For instance, *automatic* recording instruments constantly safeguard the manipulation of the cookers . . . around the clock!

How Beater Sizing Benefits from this Process

It's a long way from Armour's pressure cookers to your own beaters. But, it is *in* your sizing operations that the carefully controlled extraction shows results.

For this *modern* method of extraction enables Armour to speed up the cooking cycle. And that shorter cycle yields a higher test glue . . . glue that is more pure, with a higher jelly strength and viscosity.



At present, demand for certain grades of Armour's glue is greater than the supply. And while we may be unable to supply exactly the grade you want, we will be glad to discuss your problems with you with a view to suggesting more efficient use of glue that is available.

Size it best with Armour's

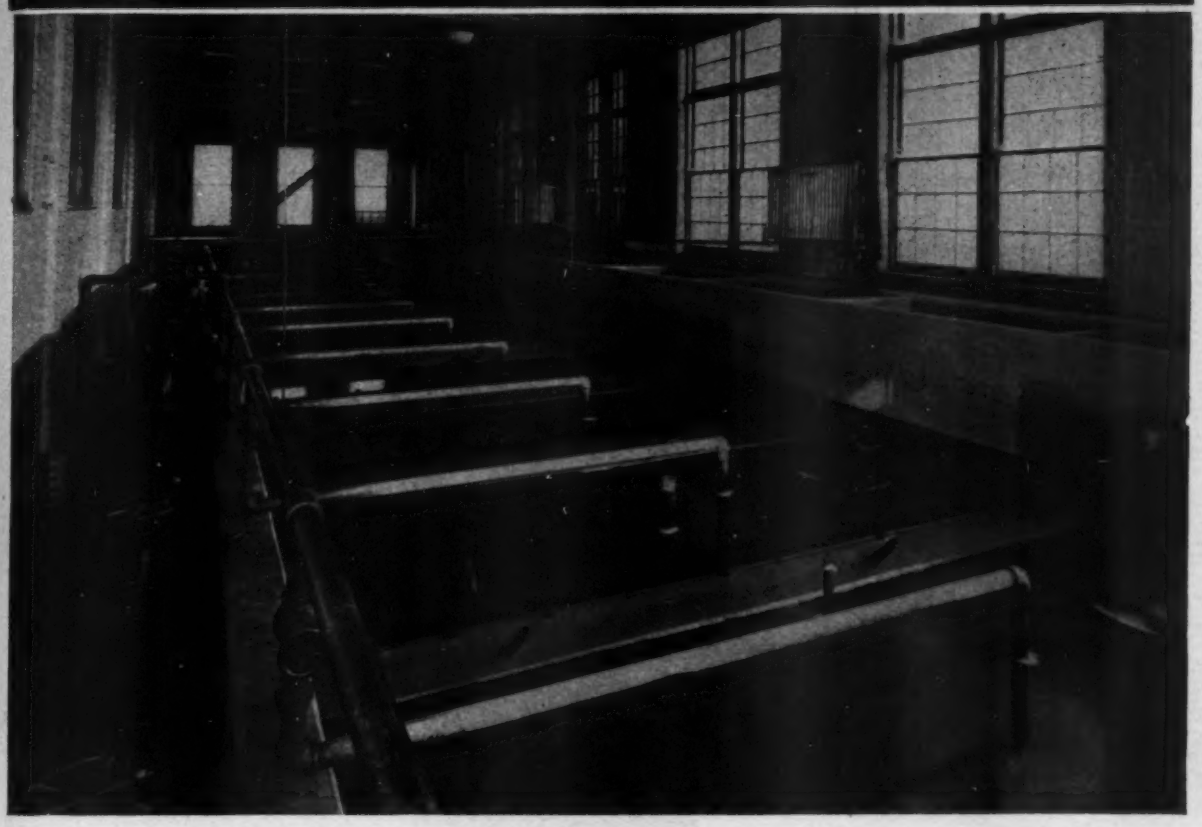
ARMOUR *Glue* DIVISION

Manufacturers of Hide Glue, Bone Glue, Flexible Glues, Soluble Dried Blood, Blood Albumin

1355 WEST 31ST STREET, CHICAGO 9, ILLINOIS

How to Get Better Process Water

. . . Have NORWOOD FILTERS And Always Keep Them In Good Operating Condition



A typical installation of Norwood Filters. Notice scum on water before filtration.

YOU can get better process water . . . to help you make a better sheet . . . if you have Norwood Filters and give them the little bit of attention they need to keep them always in good operating condition.

Norwood gravity and pressure filters are built on the basis of 50 years of working with paper mill process water problems. They have many sound features of design and construction which assure you of years of trouble-free performance.

Hundreds of Norwood Filters are in operation . . . 24 hours a day . . . in leading paper mills throughout the United States and Canada. They are doing a good job . . . filtering out dirt and foreign matter . . . and giving a clean, sparkling water that helps make a better sheet.

Check up on your filters now. Have the necessary repairs and replacements made . . . to keep them operating at top efficiency. We'll be glad to work with you.

Make use of Norwood's engineering staff. Write us about your process water problems, or ask for Filter Data Units.

Get a Good Start And a Good Finish With

NORWOOD

WATER FILTERS AND PAPER FINISHING MACHINERY

The Norwood Engineering Company

16 No. Maple St., Florence, Mass.

SURE, that Saturday night pay envelope's bulging. But let me tell you something, brother, before you spend a dime . . . *That money's mine too!*

I can take it. The mess out here. And missing my wife and kid.

What I *can't* take is you making it tougher for me. Or my widow, if that's how it goes. And brother, it *will* make it tough—if you splurge one dime tonight. You're making money. More money than there's stuff to buy. Money that can sock the cost of living to kingdom come—if you blow it! So hang on, till the job's done. On to every last dime—till the squeal means a hole in the seat of your pants!

You're working . . . and *I'm fighting* . . . for the same thing. But *you* could lose it for both of us—without thinking. A guy like you could start bidding me right out of the picture tonight. And my wife and kid. There not being as much as everybody'd like to buy—and you having the green stuff. But remember this, brother—everything you buy helps to send prices kiting. Up. UP. AND UP. Till that fat pay envelope can't buy you a square meal.

Stop spending. For yourself. *Your* kids. And mine. That, brother, is sense. Not sacrifice.

Know what I'd do with that dough . . . if I'd the luck to have it?

I'd buy War Bonds—and, God, would *I* hang on to them! (Bonds buy guns—and give you four bucks for your three!) . . . I'd pay back that insurance loan from when Mollie had the baby . . . I'd pony up for taxes cheerfully (knowing they're the cheapest way to pay for this war) . . . I'd sock some in the savings bank, while I could . . . I'd lift a load off my mind with more life insurance.

And I wouldn't buy a shoelace till I'd looked myself square in the eye and knew I couldn't do without. (You get to knowin'—out here—what you can do without.)

I wouldn't try to profit from this war—and I wouldn't ask more for anything I had to sell—seeing we're all in this together.

I've got your future in my rifle hand, brother. But you've got both of ours, in the inside of that stuffed-up envelope. You and all the other guys that are lookin' at the Main Street shops tonight.

Squeeze that money, brother. It's got blood on it!

Use it up . . . wear it out, make it do...or do without

HELP US KEEP PRICES DOWN

A United States war message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by the Magazine Publishers of America

In 1689 there was a paper shortage too!

FEW people knew of the paper shortage in 1689, because the making of paper was an art. Sheet by sheet paper was made, and only the royal and wealthy could use it. But, the art of making paper progressed into an industry until tons were produced faster than the early paper makers produced sheets.

Even the early paper makers removed water from the sheets by placing them between felt layers, and pressing out the water. Today felts remain as an important part of paper making equipment, progressing with production methods of the industry. Since 1890 Appleton Felts have met all requirements of paper mill production, year after year—today the standard for paper mill felts.

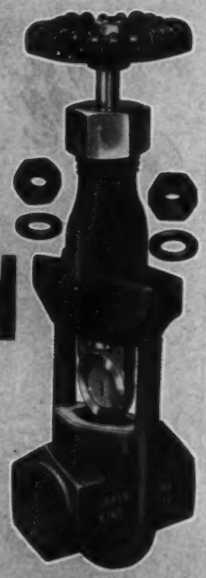
make APPLETON FELTS good paper

Appleton Woolen Mills

APPLETON • WISCONSIN

SIMPLICITY OF DESIGN MEANS EASIER MAINTENANCE . . .

LENDING A HAND *to the* MAINTENANCE MAN



YOU CAN TAKE IT APART IN A JIFFY . . . . . .

Simply unscrew two nuts at top of clip and entire bonnet-stem-disc assembly can be lifted from the body with complete accessibility for inspection.

• He can use plenty of help these days . . . his job of keeping the machinery of production going takes all he can give it. And among his most vital needs are valves that won't take a lot of costly time out for repairs . . . valves that he can depend upon for uninterrupted performance.

Such a valve is the Lunkenheimer "King-clip". Simple in design, exceptionally sturdy in construction, the "King-clip" is at its best when the going is tough. Also, it's a valve that lends itself to easy maintenance.

Note the illustration. See how easily the "King-clip" can be taken apart . . . how it simplifies maintenance. And when repairs are necessary, you can be certain that any replacement part will fit accurately—Lunkenheimer precision-gauged manufacture gives you that assurance.

Let your Lunkenheimer distributor help you with your maintenance, repair and operating problems. His facilities are at your call.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

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NEW YORK CHICAGO

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Ask for your copy of Lunkenheimer Catalog 78.

BRONZE, IRON, STEEL AND CORROSION RESISTANT ALLOY VALVES, 125 TO 2500 LB. S.P.; BOILER MOUNTINGS, LUBRICATING DEVICES, AIRCRAFT FITTINGS

PATENTS *and the Paper Industry*

M. P. CHAPLIN, President
Chaplin Corporation

▶▶▶ THE UNITED STATES PATENT SYSTEM is not a recent creation nor is it a result of years of rapid industrial growth. Rather it has been responsible, in a great measure, for our industrial growth and manufacturing prosperity. It is rooted in our earliest Colonial history. The first American saw mill was invented in Maine in 1634. The colonies in Massachusetts issued patents as early as 1641 and New Hampshire in 1786. The states of New York and Connecticut also issued patents.

When the United States became a nation, the Government clearly recognized the value of patents as a means of fostering and encouraging invention and progress. We find in the Constitution of the United States, Article I, Section VIII, the following provision:

"The Congress shall have power . . . to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

A patent, therefore, is a grant from the Congress of the United States to an individual, in recognition of his efforts in creating something new and useful. The individual in turn makes a full disclosure in his written grant or patent, of what he has invented or discovered, so that anyone interested may make use of his ideas. Appended thereto are certain claims or statements of newness or novelty allowed by the Patent Office. These statements or claims indicate specifically what the individual invented and what the Patent Office, acting for the Congress, has determined shall be his monopoly for a certain period of years.

And, for a full and complete description of what the individual, by his own efforts, has discovered or created, Congress says that he shall have an exclusive right to use or practice, or license others to use his invention, as defined by his allowed claims, for a period of years, after which time the public may use or practice his invention as extensively as it may wish.

Prior to 1836, United States patents were not numbered, but were identified by name, title of invention, and date of issue. There are between nine and ten thousand of these unnumbered patents. One of the earliest of these patents having to do with pulp or paper was issued to John Biddis on March 31, 1794, for "Improvement in Manufacturing Paper."

The earliest numbered patent dealing with this art was issued to Boriah Swift on August 10, 1836, for "Dyewood and Dye-stuff Cutting and Shaving Machine." This is patent No. 10 of our present series. It is in reality what we now call a Pulpwood Chipper.

There was a lapse of twenty years before the next patent dealing with paper making was issued, and the next five patents issued between 1856 and 1864 all had to do with chemical pulp in some form. One of these was taken out by a resident of Canada, another by a resident of France. The next patent, taken out in 1866, had to do with a machine for making paper fans. This was followed in 1869 and 1871 by patents on machines for wrapping candy. There followed in 1879 another patent for the manufacture of chemical pulp, and a year later a resident of England secured a patent on a method of manufacturing articles for containing petroleum. In 1890, there was issued a patent covering a process of disintegrating pine needles to reduce them to papermaking fiber. One of the earliest patents on a paper article was issued in 1893, covering a file case, not unlike the paper file cases we are using today to save metal.

There are approximately 8,000 patents in the three principal classes or groups of patents in the Patent Office today having to do with papermaking, including (1) preparation of materials, (2) paper manufacture, and (3) the conversion of the finished sheet, or treatment of the finished sheet by coating or similar processes.

In the class of paper receptacles or products made from paper, something over 11,000 patents have been issued to date.

Up to January 1 of this year, the Patent Office had issued 2,338,080 patents, exclusive of designs, etc., so we have approximately 1½ per cent of the patents issued so far relating directly to the paper industry.

Almost half the total patents issued in the United States to date came out during the past 25 years, or 1,047,720 out of a total of 2,338,080. There were issued last year (1943), 31,073, which is considerably below the average for the last 25 years.

It may be of interest to many in the industry to know approximately how many patents have issued to date under the principal sub-headings in the three main groups of patents dealing directly with the pulp and paper industry. The following table gives this information:

Papermaking and Fiber Liberation

STOCK TREATMENT	115
By-product Recovery	90
Combined Grinding and Digesting	90
Digestive	300
Acid, Sulphurous	250
Fiber	25
Alkaline	270
Special Paper Stock	140
Fiber	95
Miscellaneous Reagents	220
Fiber	90
Fiber	35
Shells and Linings	70
STUFF WORKING	315
Special Material Incorporation	575
Beating Engines	160
Horizontal Course	175
Vertical Course	70
Refining Engines	220
Cone and Shell	135
Strainers	
Flat Screen	90
Horizontal Stationary Vertically Vibrating Diaphragm	90
Shaking	75
Cylindrical Stationary Screen	85
Cylindrical Rotating Screen, Outward Flow	90
Cylindrical Rotating Screen, Inward Flow	90
Stuff Chests	70
WEB FORMING	220
Special Work	250
Special Material Incorporating	250
Cylinder Machines	120
Cylinder Machines	165
Cylinder Machines	175
Fourdrinier Machines	250
Shake Frames	90
Feed Regulators	160
Dandy Rolls and Watermarking Devices	125
Press Rolls and Felts	220
Felts and Wire Cleaners	100
Suction Boxes	120
Traveling Face	50
Cylindrical	100
PULP MOLDING	175
Special Material and Object Incorporating	95
Combined Submerging and Compressing	100
Submerged Mold	90
Compressors	90
Sheet and Board Forming	90
Winders	75
Sheet and Board Forming	70
FINISHING	115
Flexibility Imparting	75
Calenders	70
Reciprocating Polisher	40
Stack-rolls Type	35
Doctors and Guides	100
Rolls	45

Coating

SPECIAL MACHINES
- Photographic Film and Plate 35
- Marbling 20
- Striping 110

COMBINED MACHINES
- Coating and Cutting 130
- Coating and Folding 20
- Coating and Printing 40
- Coating and Stretching 30

MACHINES 200
- Fountain and Roller 35
- Immersion and Roller 115
- Immersion and Scraper 115
- Roller and Scraper 40
- Brush
  - Fountain Feed 100
- Centrifugal 60
- Fountain 240
  - Projection 200
    - Air Brush 275
- Immersion 400
- Impression 150
- Roller 100
  - Fountain Feed 155
  - Roller Feed 240
  - Tank Feed 415
- Scraper 85

DRYERS AND COOLERS 150

WIPERS AND DUSTERS 100

IMPLEMENTS
- Brush Holders and Cleaners 40

FABRIC COATING AND PRINTING 225
- Fraud Preventing or Detecting 115

PROCESSES 2700
- Photographic Film and Plate 65
- With Heat 800

Paper Manufactures

MISCELLANEOUS 200

WRAPPING MACHINES
- Miscellaneous 1075
- Receptacle Making and Filling 275
- Receptacle Filling and Closing 425
- Crimpers and Twisters 250

BAG MACHINES
- Miscellaneous 200
- Central Fold 90
- Web Formers, Cutters, Openers and Closers 100
- Web Formers, Cutters, and Closers 125
- Web Formers and Cutters 100
- Web Formers 100
- Cutters and Openers 30
- Closers 125
- Cutting 90
- Methods 250

BOX MACHINES
- Miscellaneous 250
- Pasters or Gluers 110
- Box Blank Covering 100
- Cell Cases 110
- Folding and Setting Up 115
  - Tube and End Closing
    - Turret Form Carrier
      - Frustro-conical Form 90
- Folding and Staying 75
- Setting Up and Covering 90
- Endless Mandrel Carrier 80
- Folding, Web Supply 75
  - Plunger and Die 90
  - Stationary Folders 80
- Folding 225
  - Dryers 65
  - Plunger and Die 175
  - Stationary Folders 100
- Refolding and/or Opening 90
- Covering 120
- Setting Up 115
  - Applying End Closures 180
- Cutting and Scoring 115
- Plaiting 110

ENVELOPE MACHINE
- Miscellaneous 250
- Rotary
  - Blank Supply 110
  - Web Supply 115

TUBE MACHINES
- Tapering Wind 125
- Spiral Wind 200
- Convolute Wind 300
- Axial Feed 125
- Sizing and Burnishing 60

FOLDING
- Miscellaneous 65

BUNCHING AND BANDING
- Tube
  - Methods 110

In addition there are some 11,000 patents on paper and fiber articles.

In Canada during the past 25 years 228,275 patents have been issued as the result of 363,559 patent applications. More applications were filed in 1921 than in any other year during this period. Fewer applications were filed in 1941 than during any other year during this period. The greatest number of patents were issued in 1923 which corresponds to the greater number of applications filed in 1921. The fewest patents were issued in 1940.

While the general trend of patent applications has been downward, there has been a very consistent increase in applications filed during the last three years.

There is no accurate information as to the number of Canadian patents pertaining directly or indirectly to the pulp and paper industry, as these patents are included in one of the largest groups; namely, that of chemistry, which, besides chemicals includes fuels, oils, plastics, pulp, metallurgy and electric chemistry.

It is interesting to note that of the 7,686 Canadian patents issued last year, 6,003 were granted to residents of the United States.

The approximate number of British patents issued from 1931 to 1941 (both years inclusive) which relate directly to the pulp and paper industry are 1,221. The number of patents issued each year varies from 109 to 134 between the years 1931 and 1938, the greatest number being issued in 1932. However, in 1940 only 70 patents were issued and in 1941 only 47.

Immediately after Pearl Harbor, the Office of Alien Property Custodian was directed by the President to seize all patents controlled by the enemy regardless of nominal ownership, and to make available to American industry, first for war purposes of the United Nations and second, for general use in the national interest.

Transmitting this information to the public and to industry, Leo T. Crowley, Alien Property Custodian, made the following statement:

"United States Government, through the office of Alien Property Custodian, now holds about 50,000 patents formerly owned by residents of enemy and enemy occupied countries. Inventions disclosed in these patents represent achievements of great potential value.

"It is our privilege to offer these patents for use by American industry. They will have high usefulness as a means toward winning the war and as a contribution toward building our peace-time economy. The success of this program will depend largely on how rapidly and effectively American business utilizes the inventions covered by these patents for increased and improved production."

Of the patents listed by the Alien Property Custodian, at least 2 per cent are of direct or indirect interest to the pulp and paper industry. These include the following classes and also the patent applications in each class:

	Patents	Applications
Bleaching and Dyeing	154	19
Plastics	378	120
Plastic Composition	309	61
Chemistry	824	67
Chemistry, Carbon Compounds	1607	399
Drying	114	4
Coating	78	30
Coating Processes	160	35
Papermaking and Fiber Liberation	139	33
Paper Manufactures	149	25
Paper Files and Binders	89	6
Laminated Fabric	137	37
Classifying, Separating and Assorting Solids	184	19
Paper Receptacles	56	8
Special Receptacles and Packages	35	2
Sheet or Web Feeding	100	21
Winding and Reeling	121	7

Lists of vested patents and applications can be secured from the Office of Alien Property Custodian, Chicago. Printed copies of each patent can be secured from the Commissioner of Patents, Washington, for ten cents each—in the same manner as all other

United States Patents. Copies of vested applications can also be secured.

During the past hundred odd years that our patent system has been in existence, it has been under attack from time to time and for various reasons.

All good things are subject to attack in a free democracy such as ours, and the fact that the system has survived each successive attack only to become stronger than before is an indication of its value and service to the country.

During all these years our patent system has continued to function in substantially the same form as it was created. In recent years, however, there have been rather severe criticisms as to so-called patent abuses, and various things have been said and printed which are more confusing than enlightening. None of these, however, questions the value of patents in promoting industrial progress.

Criticism and attacks on our patent system are not exclusively of recent origin. As long ago as 1852 Daniel Webster felt called upon to define the rights of principles of the inventor. The following is quoted in part from his statement at that time:

"Upon acknowledged principles, rights acquired by invention stand on plainer principles of natural law than most other rights of property. Blackstone and every other able writer on public law, thus regards this natural right and asserts man's title to his own invention or earnings.

"The right of an inventor to his invention is no monopoly. It is no monopoly in any other sense than as man's own house is a monopoly. A monopoly, as it was understood in the ancient law was a grant of the right to buy, sell, or carry on some particular trade, conferred on one of the king's subjects to the exclusion of all the rest. Such a monopoly is unjust. But a man's right to his own invention is a very different matter. It is no more a monopoly for him to possess that, than to possess his own homestead.

"But there is one remarkable difference in the two cases, which is this, that property in a man's own invention presents the only case where he is made to pay for the exclusive enjoyment of his own. For by law the permission so to enjoy the invention for a certain number of years is granted, on the condition that, at the expiration of the patent, the invention shall belong to the public. Not so with houses; not so with lands; nothing is paid for them except the usual amount of taxation, but for the right to use his own, which the natural law gives him, the inventor as we have just seen, pays an enormous price. Yet there is a clamor out of doors, calculated to debauch the public mind."

In most, if not all, of the investigations of our patent procedure, the critics have had one underlying thought. and that thought is that the inventor has taken something away from the public which the public should get back. Nothing could be farther from the truth.

A patent is *not* a private privilege carved out of the public domain. Anyone making an invention which can be protected by a patent creates something which the public did not then have, and to which it can make no claim. The invention belongs to the individual who created it, and to him alone.

The patent system is designed to induce any and all, not only to work and create new things, but to give those things to the public after a certain period of time during which the individual who created the thing is given an opportunity to get a reasonable return on his investment in money and time.

It should be clear, therefore, why our patent system, as it has operated for the past hundred-odd years, has contributed so tremendously to the progress of this country. The added incentive given to inventors to develop new things by giving them a right to the exclusive use or practice of these things for a time, has resulted in this country being far ahead of all other countries in technological progress and achievement.

During the relatively short period during which the inventor is granted the exclusive right to use his invention, the public is enabled to purchase from the inventor, or his license, products, machines, and conveniences which they would not otherwise have had.

After this limited time has expired, the public then has free and open rights to use and practice these inventions as widely as the merits and utility of the invention may warrant.

Much has been made in certain circles of the agreements between American industrialists and those of Germany and other now enemy countries. Certain agreements or cartels (as they are commonly called) were, in effect, a pooling of patents and research information between companies in similar fields, but in the different parts of the world. It is not the purpose of the author to discuss here the justice or injustice of these cartels or agreements in any way. It should be pointed out, however, that the encouragement of an invention is one thing, while the division of the world into empires to be economically controlled through patents is quite another. This distinction never should be forgotten.

There are a limited number of jurists and attorneys who feel that the standards of patentability have changed during recent years. Justice Douglas in a recent decision of the Supreme Court defined invention as "the flash of creative genius." Genius has been aptly defined as "but a capacity for taking infinite pains." A "flash" is obviously something of instantaneous and momentary duration. It is difficult to reconcile the two terms.

If we turn back the pages of history to those great inventors such as Bell, Edison, Howe, McCormick, Westinghouse, Wright, and many others, we will find that each devoted many years of intense and often heartbreaking effort before their ideas achieved practical reality.

No one who has seen the films which so vividly portray the lives of Bell and Edison can but say that, while the problem of transmission of a voice by electric waves, or the creation of light by electricity may have "flashed" across the minds of these great men, the solution of the problem was long and hard. It is the solution and not the flash which forms the basis of a patent.

Only those who are working in new and creative fields, or who are associated with that group of individuals continually searching for new things (sometimes called inventors), really can appreciate what true invention is. It is not something which has been clarified by academic discussion, or something which can be defined adequately by a dictionary definition. Someone has propounded this question, "Can a man for 364 laborious days be merely 'a mechanic skilled in the art' and then suddenly on the 365th day become a 'genius' qualified for recognition as such by any authority"?

Patent controversy has raged in low and high places reaching our highest court with apparently wide differences of opinion on the validity or soundness of certain patents.

In view of all this, it is small wonder that those in industry who do not have the time to find out what this is all about, naturally begin to question the value of our patent system and lose interest in it.

It would, indeed, be unfortunate for the paper industry, in view of its remarkable contribution to the war effort, and the innumerable new and valuable developments brought about thereby, should it, through lack of knowledge of our patent system and how it works, neglect the opportunities which this system affords, to protect new and valuable ideas and also as a source of information.

▶▶▶ THE AMERICAN PATENT SYSTEM is sound, constructive, and creative fundamentally. Whatever may be wrong with it and subject to improvement lies more in certain business practices applying to the use, or rather the misuse, of patents and not the system. We do not condemn water and fire *per se* because, through misuse, one drowns and the other burns.

Were it not for our patent system, the inventor would have little choice but to keep and practice his invention in secret as best he could. He may, if he chooses, let his invention and development die with him as actually happened with certain ancient arts. Obviously, any such procedure would be disastrous to our industrial progress.

Several hundred opinions have passed across the author's desk in recent months concerning our patent system. These opinions express the thoughts of those in the pulp and paper industry, or in industries directly associated therewith.

A few of these have been selected by the author for comment here, drawing upon his experience with patents, both within and without the paper industry. Space will not permit a complete treatment of each one, but it is hoped these limited comments will clarify some misconceptions of our patent system and will promote intelligent thought and discussion within the industry.

Mr. A.—"Wanted—Screwball inventor who gets occasional sparks of sanity."

Mr. A. is not anywhere near as crazy as his plea might sound. He recognizes two things: First—An inventor is one who frequently embarks on new and quite unknown seas, and more than one inventor of note in our past history has been deemed irrational by his associates and neighbors. Second—He also recognizes another essential fact, that while the individual may, in his search for entirely new things, seem irrational, he must have moments of real sanity and stability in order to get his ideas in workable shape. There have been many instances where the inventor, from his mental and temperamental makeup was not able to stay on one thing long enough to get his ideas in workable shape, and in many cases as soon as he had accomplished his primary object, he was off on some other track or idea.

Many companies recognize this, and their research and development program is organized to utilize the peculiarities and abilities of each individual of their organization, and to take the ideas of the inventor and turn them over to someone who, working with the inventor, has the patience to apply them to practical use.

We should not, however, overlook another type of inventor who is the slow, methodical, plodding type, who keeps plugging away at some idea or some particular problem and eventually comes through with a logical and valuable answer. There are certain of the arts, of which chemistry is one, which almost requires such a procedure and method of approach in developing things which are new and valuable.

Mr. B.—"As presently operated, an individual or small business is usually not in position to protect whatever patents it may secure."

Mr. B's complaint is one which is not infrequently voiced, and such a feeling may deter many from taking out patents as they feel that they will only lose them to some competitor or stronger company.

Such a feeling is generally predicated on the assumption that the small company or the individual inventor is helpless in the hands of big industry. And there have been cases where individuals and companies have taken unfair advantage of the inventor and the small competitor. So minded companies or indviduals would have done this anyway, and the fact that a patent is involved in some of these cases is merely incidental.

So long as there are people in the world, there will be those who feel that sharp or acute practice is the way to do business, and will take any advantage which they think they can get away with, of an inventor, or of a patent owned by a smaller or weaker company.

Happily the number of people or companies operating on this principle are few. Such a company usually has a skeleton or two in the closet which it thinks buried for all time. However, it usually wakes up one morning to find the closet door open and the skeleton in the hands of the one person he would have given his right eye to keep from finding him out.

Any individual or company who practices such methods usually has a weak patent situation, therefore, does not care particularly how much it tears down or weakens anyone else's patents. Or it may not have thought the thing through that far, and because of its very short-sightedness, may find that it is injuring its own interest a great deal more than anything else.

One answer to this is, of course, competent and experienced patent counsel. Our patent system is complicated and involved, perhaps unfortunately, but competent counsel *can* steer clear of the pitfalls and hazards into which otherwise an inventor might fall.

Mr. C.—"After many years' experience in practice and consideration of the problems involved in practice under the United States patent laws, I appreciate that our patent system is not without some faults, but I cannot look with favor on most of the suggestions for changing our system that have come to my attention in recent years."

Mr. C. expresses an opinion and a feeling prevalent generally through the pulp and paper industry, and I believe through industry as a whole. And these individuals, while realizing that there may be faults and weaknesses in our patent system, are looking for and expecting constructive criticism rather than anything which attempts to tear down what has already proved useful and valuable.

Mr. D.—"The patent system is a racket pure and simple, and consequently we have nothing to do with it."

Mr. D. has a very perverted and wrong idea of our patent system. It may be that someone with whom he has done patent business has operated on the racket principle. The patent system itself is not, never has been, and never will be a "racket," as we use that term.

It is indeed unfortunate that anyone, and I think the number is few, should get it into his head that our patent system is controlled by irresponsible individuals. There may be certain irresponsible people in it, yes, but fundamentally, the system is sound. The routing out of those irresponsible individuals who can do much harm to the honest individual, is the duty of everyone having anything to do with patents and patent procedure.

Mr. E.—"We feel that there is too wide a leeway in this so-called process patenting by certain consulting engineers and men who have not put their ideas into actual practice."

Mr. E. raises a point where there might be confusion which easily can generate ill feeling within the industry. As a suggestion, divide consulting engineers and consulting firms into two broad groups. First, those firms who do general work such as architects, construction engineers, and the like who deal with broad and general problems within the industry. The other group is composed of those who specialize in some particular phase or part of the industry and by such specialization develop new things which are of interest and value to the industry in that particular field.

Now there are two general ways in which consultants can be of real service to firms. First, by their general knowledge of the industry or

some particular phase or part of the industry, which knowledge a consultant may sell to his client for a certain fee. The other opportunity for service is where certain developments which the consultant or his firm has worked up or developed, and on which patent applications may have been filed or patents taken out.

Much, if not most, of the confusion which can arise between consulting engineers, and the industry, is largely due to a lack of understanding of what is to be done and what each is to contribute at the start of the job. If the consultant, through his general or specific knowledge and experience, develops something patentable in the course of his work for his client, then some part of his agreement or understanding should cover this particular situation. If this development is the result of exclusive work done for and money paid by a client, the client should have the benefit, although any patent must be applied for by the inventor though he be only consultant for someone else.

If the consultant has developed on his own certain ideas and machines and processes, he should make this very plain to his client beforehand, so that if these developments fit in with his client's work, the consultant would expect to get additional remuneration for such time and use as the client may make of his inventions.

Any firm has every reason to take advantage of such an offer from a consultant for if the consultant has spent a number of years on some particular problem or phase of the industry, he can get results for his client very much quicker and cheaper than anyone who had not done previous work along certain lines.

The consultant should be perfectly free and open with his prospective client, and tell him (preferably in writing) of such ideas and developments as he may have been working on which might possibly apply to his client's activities. Any reasonable client would, under the circumstances, recognize certain rights of the consultant to these ideas, and be more than willing to pay the consultant a reasonable amount for them provided, of course, that they fit in with his operating plant, and he has a reasonable chance to make money on these ideas himself.

The consultant and his client must work as a team. The consultant necessarily must place himself pretty much in the hands of his client, and give him full information and new ideas based on the consultant's years of experience. If the client shows any disposition to take advantage of the consultant, effective team work is impossible and the client will lose much of what he may have thought to gain. His competitor may be more farsighted.

It has been my experience that confusion and misunderstanding can be avoided between fair-minded people by careful consideration of the problem which the consultant is expected to tackle, and a clear understanding as to the outcome, provided certain things are accomplished.

Mr. F.—"We make a practice of patenting developments but have not made any applications for the past two years."

Mr. G.—"Our company has had patents granted in past years, although none in recent years."

Messrs. F. and G. are characteristic members of the pulp and paper industry. No set of fixed rules is applicable to all companies, but as elsewhere indicated in this article, the achievements of industry in recent years would seem to justify careful consideration of the novelty of these ideas and whether or not in fairness to the companies that have developed them, that patent consideration should be one of the orders of the day.

Mr. H.—"We believe that the present United States Patent System has answered splendidly the purpose it was set up for."

Mr. H. represents a smaller proportion of the industry, and apparently has been following an orderly and systematic program.

Mr. I.—"We have never been particularly interested in the matter of patented ideas, although we have once or twice done that but have not followed it up."

Mr. J.—"We have had no experience with the United States Patent System, and therefore are not in a position to give you any ideas on this subject."

Messrs. I. and J. represent a rather substantial proportion of the industry, and it may be that this portion of the industry is in a particular class where there is very little opportunity for novelty or patent protection. Here again, these particular individuals or firms may be overlooking something, largely through lack of knowledge of how to analyze their particular situations.

Mr. K.—"I have thought that the United States Patent System in its present form is good, but have had very little experience on which to base this information."

Mr. K. has evidently given some thought to the patents, but has not done very much about it. He is in about the same position as Messrs. I. and J. and very probably through press of other matters has not felt that he had time, or is not really disposed to find out what benefits he might get from patents.

Mr. L.—"I am very much in agreement with the present patent system and believe it should continue."

Mr. L.'s attitude is much the same as Mr. H. and quite evidently he has had fair and reasonable results with his patent program.

Mr. M.—"We do patent developments, but in number they are very few."

Mr. M. may be in a group or field where there is comparatively small opportunity for invention or patentable novelty. However, in some of these fields where seemingly nothing new develops, when one goes back over the work of the last year or two, or more, he is amazed to find that a lot of things which he is doing today are quite different and a lot better than what he was doing a few years ago. Whether or not this presents patentable novelty, or whether it is worth while to patent his ideas is something which must be decided on the merits of the individual case.

Mr. N.—"Due to the status and the way patent matters are handled in the United States, we have refrained from taking out patents on the number of improvements and devices, and our company has made no ruling on the practice of patenting."

Mr. N. has evidently had some unfortunate experience in patent matters which has left him rather sour on the whole idea. One not uncommon pitfall which starts the whole thing out wrong is the lack of proper understanding between the inventor, the company for whom he works, and patent counsel. The author knows of no more difficult profession than that of the patent attorney. This statement is made after many years of experience with attorneys, firms and many different patent problems.

An inventor who gets a bill from a patent attorney for $150, more or less, for a few sheets of typewritten manuscript and a sheet or two of drawings may feel, in absence of knowing what it is all about, that he has been charged outrageously. If, however, his attorney is competent and has been conscientious (as most of them are) he undoubtedly has made a search of the patent records at Washington, if he does not already have in his files most of the patent art relating to the particular invention which is under consideration.

If he is competent and thorough in his work, he may have had to consider a dozen or two, or a hundred or two, other patents before he can determine, first, whether or not the inventor has something really new, and second, what limitations are imposed

Patent Opinions in the Circuit Courts of Appeals, October, 1936, to March, 1941.

CIRCUITS:	1st		2nd		3rd		4th		5th		6th		7th		8th		9th		10th		D. C.		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Total Patent Opinions:	14	100	106	100	64	100	20	100	19	100	68	100	82	100	21	100	46	100	18	100	4	100	462	100
1. Valid and Infringed:	5	35.71	16	15.09	11	17.18	3	15.00	0	.....	12	17.64	15	18.29	4	19.04	6	13.04	2	11.11	0	.....	74	16.01
2. Valid; not Infringed:	1	7.11	2	1.88	0	.....	0	.....	0	.....	1	1.47	3	4.64	1	4.76	2	4.34	2	11.11	0	.....	12	2.59
3. Total Valid (1+2):	6	42.82	18	16.97	11	17.18	3	15.00	0	.....	13	19.11	18	22.93	5	23.80	8	17.38	4	22.22	0	.....	86	18.60
4. Total Invalid:	7	50.00	58	54.71	34	51.32	12	60.00	16	84.21	33	48.52	53	64.63	8	38.09	20	43.47	8	44.44	1	25.00	250	54.11
5. Opinions holding patent part valid; part invalid:	0	.....	10	9.43	7	10.93	1	5.00	0	.....	8	11.76	3	4.64	1	4.26	4	8.69	1	5.33	0	.....	35	7.57
6. Validity not in question; infringed:	0	.....	3	2.83	0	.....	0	.....	0	.....	0	.....	0	.....	1	4.76	0	.....	1	5.33	2	50.00	7	1.51
7. Validity not in question; not infringed:	1	7.11	17	16.03	12	18.75	4	25.00	3	15.78	14	20.58	8	9.75	6	28.57	14	30.43	4	22.22	1	25.00	84	18.18
8. Total Infringed (1+6):	5	35.71	19	17.92	11	17.18	3	15.00	0	.....	12	17.64	15	18.29	5	23.80	6	13.04	3	16.44	2	50.00	81	17.53
9. Total invalid or not infringed (2+4+7):	9	64.22	77	72.64	46	70.07	16	80.00	19	100.00	48	70.58	64	79.02	15	71.42	36	78.24	14	77.77	2	50.00	346	74.88
Rank According to Number of Opinions:	Tenth		First		Fourth		Seventh		Eighth		Third		Second		Sixth		Fifth		Ninth		Eleventh			

by other patents and how he can write the specifications and claims for the inventor to get the best result in form of patent protection.

Any attorney who does not follow some similar procedure is not rendering to his client the kind of service to which the inventor is entitled.

The inventor naturally and very frequently assumes from his (the inventor's) knowledge of the particular thing he has invented, that his attorney knows all about it at the start, and consequently does not give his attorney the proper and adequate background so that he can really start in at the bottom and develop the whole idea. He must do this before he can properly prepare and prosecute a patent application on any particular subject.

A number of cases are recalled where suspicion and friction develop between the inventor and the attorney, and the company who is paying the bill is apt to get rather disgusted and disgruntled with the whole procedure and call it off. Such an event can be a tragedy to the inventor, and may be a real loss to the firm, as it is not unusual to have a valuable and real invention go by the board due to such confusion and misunderstanding.

One of the most tedious and exacting jobs which patent attorneys and consultants can have is to unravel such a misunderstanding and get started on the right track. The more knowledge one has of the particular art or field in which the invention is concerned, the quicker and more logically one can find what has gone wrong and get things straightened out.

Mr. O.—"I have been told that most patents are invalid and that the courts are throwing them out right and left."

Mr. O. probably has read some of the articles in the press and journals concerning phases of court decisions, and perhaps the Supreme Court Decisions of the last year or so.

It should be realized at the on-set that those cases which come before the courts, either the lower courts or the Supreme Court, cover only a very small percentage of the number of patents which are issued, and which are usefully employed by industry. They represent cases where there is a definite difference of opinion as to the scope and validity of the patent, and quite frequently represent those cases where the owner of the patent is willing to spend substantial amounts of money to stretch his protection to the utmost.

Judge Evans of Chicago analyzed the opinions of the Circuit Court of Appeals, October, 1936, to March, 1941, and of the Supreme Court Decisions on patents from 1900 to 1940.

"On the question of trends in respect to the existence of patentable invention, the statistics are not sufficient, and I am much in the dark as to whether the patents presented to the court are the important worthwhile patents which have greatly influenced industry in the United States or whether they are the doubtful and less important patents which deal with narrow improvements.

"I am convinced that judicial opinions of the Circuit Court of Appeals do not justify the conclusion that a meritorious discovery of wide reaching effect on industry is viewed less favorably today than 40 years ago."

The accompanying tables give the result of this very complete investigation.

It seems to be the general feeling that many of those patents which have reached the higher courts are those of, shall we say, not outstanding or vital value to the industry in which they are included. There are, of course, exceptions to this, but there is a very decided indication in this direction. The author has records compiled from the Patent Office Gazette for a number of years, and his own observation from these records are summarized as follows:

Patents held valid	164
Court Judgment in favor of inventor	74
Consent Judgment in favor of inventor	117
Patents Infringed	27
Injunction in favor of inventor	14
Patents held invalid	256
Patents not infringed	67
Suits dismissed or discontinued	586
Suits decision not determined	354

All evidence very decidedly shows that the courts are not throwing out patents which have value and which are valid. Of necessity, they must weed out the weak patents and those which obviously are anticipated by prior patents.

Mr. P.—"Even when I have been able to get a patent—I am told that subsequent search in the patent office has turned up some patents which knock mine out. None of these patents seems to me to be my idea at all.

Supreme Court Decisions on 91 Cases 1900-1940 (shown in 5-yr. periods).

Years	Total	Valid	Invalid	Not infringed	Total, invalid and non-infringed
1900-05	9	2; 22.22%	3; 33.33%	4; 44.44%	7—77.77%
1906-10	7	3; 42.86%	1; 14.28%	3; 42.86%	4—57.14%
1911-15	4	4; 100%	0; 0%	0; 0%	0—0%
1916-30	16	5; 31.25%	9; 56.25%	2; 12.50%	11—68.75%
1921-25	14	3; 21.43%	8; 57.14%	3; 21.43%	11—78.57%
1926-30	12	3; 25.00%	5; 41.67%	4; 33.33%	9—75.00%
1931-35	14	3; 21.43%	11; 78.57%	0; 0%	11—78.57%
1936-40	15	0; 0%	13; 86.67%	2; 13.33%	15—100%

Then I am told that patent standards have changed and that any good mechanic could have taken these old patents and built my machine."

Mr. P. is concerned with a practice by a limited number of people or firms, who, together with their patent counsel, play both ends against the middle. Sometimes they win, but more often they lose, particularly in the long run. There may be a few attorneys who file and prosecute patent applications either through ignorance of patents already issued, or else with the idea of securing very limited claims on something on which novelty and patentability is certainly questionable. In most cases, a patent secured on such a basis is worthless.

There is another group of attorneys who will prosecute applications covering ideas having substantial novelty, advancing all possible arguments before the Patent Office for allowance of claims, but, if, and when they find that someone else has an application in the office which anticipates theirs, or someone else has obviously thought of or invented the same thing before, will about face and contend that the thing isn't patentable at all, absolutely reversing their previous arguments.

Such practices are confusing to the inventor and particularly confusing to the Patent Office itself, who normally would respect the arguments of patent counsel as based on fair procedure and authentic facts.

When an attorney, arguing a case before the Patent Office, presents one argument this month or this year, and a totally different argument next year, the Patent Office officials are apt to conclude that there cannot be very much to the invention anyway, and not give the case very much further intelligent consideration. This, of course, works a hardship on the real inventor.

It sometimes happens that the firm which owns or controls the patent application either winks at or encourages such a policy. This may gain something temporarily for the firm or individual, but indicates a weakness and unsoundness in their fundamental patent policy.

Mr. P. also has touched on one of the most difficult problems confronting competent patent counsel, patent office officials and the courts, in determining the degree of novelty of any invention. In order to pass the commonly accepted test of validity or novelty, an invention must have been determined to be something beyond the capabilities of an ordinary mechanic or "one skilled in the art" who, having knowledge of previous patents relating to a particular subject, still does not accomplish the result covered by the invention in question.

There is, perhaps, no better example of the difficulties of the courts in attempting to dispense justice on patents and patent suits than the Marconi case which came before the Supreme Court last year.

The name Marconi and Wireless Telegraphy are almost synonymous. Nevertheless, the Supreme Court decided, in effect, that Marconi was not the original inventor of wireless telegraphy, but rather a man by the name of Stone. This verdict was a divided one and the dissenting opinions indicate something of the problems which judges face in attempting to decide a case of this kind. One of the dissenting opinions quotes Judge Leonard Hand, who had the following statement to make in one of the cases which appeared before him:

▶▶▶ "I cannot stop without calling attention to the extraordinary condition of the law which makes it possible for a man without any knowledge of even the rudiments of chemistry to pass upon such questions as these. The inordinate expense of time is the least of the resulting evils, for only a trained chemist is really capable of passing upon such facts, e.g., in this case the chemical character of Von Furth's so-called 'zinc compound,' or the presence of inactive organic substances . . . How long we shall continue to blunder along without the aid of unpartisan and authoritative scientific assistance in the administration of justice, no one knows, but all fair persons not conventionalized by provincial legal habits of mind ought, I should think, unite to effect some such advance."

One dissenting opinion goes on to say,

"It is an old observation that the training of Anglo-American judges ill fits them to discharge the duties cast upon them by patent legislation. Above all, judges must avoid the subtle temptation of taking scientific phenomena out of their contemporaneous setting and reading them with a retrospective eye."

"The inescapable fact is that Marconi in his basic patent hit upon something that had eluded the best brains at the time working on the problem of wireless communication."

"To find in 1943 that what Marconi did really did not promote the progress of science because it had been anticipated is more than a mirage of hindsight."

The Marconi case has been discussed at some length as it is one which shows very clearly the problems judges have to face under our present patent system. The irony of all this is that a patent which expired 20 years ago is now deemed invalid by a majority of the Supreme Court.

This decision revolves entirely around the point as to whether or not one skilled in the art could have taken the ideas disclosed by another, and have done what Marconi did. There are various technicalities involved and some opinions hold that Stone did not properly disclose his invention prior to Marconi, and that his ideas did not anticipate Marconi. Be that as it may, so long as we have our present system for adjudicating patents, judges who can know very little about the technicalities involved are called upon to decide technical questions and problems on which others have given their entire lives in thought and study.

The National Patent Planning Commission made its report to the President about the middle of last year, the highlights of which are as follows:

1) The principle of recognizing a property right in an intellectual creation is sound and should be continued.

2) No serious problem is involved in patents in the war effort.

3) Proposed modification of existing patent laws are provisions for

a) Recording all patent agreements.

b) Limiting suit for infringement to reasonable compensation without prohibiting the use of patent invention if the invention is necessary to national defense or public health or safety.

c) Cancellation of patents which should not have been issued.

d) A public register of patents for which the owner will grant licenses.

e) A national standard for determining patentability.

f) Referring court records in infringement suits to the patent office for an opinion.

g) Establishment of a single court of patent appeals.

h) Limiting patents terms to not more than 20 years after application is filed.

i) Designating court of Customs and Appeals as sole receiving body upon denial of the patent by the patent office.

There is no suggestion here of any fundamental change in our Patent Procedure—but rather a clarification and simplification.

To determine whether or not one is entitled to a patent, a search is made of prior patents in similar fields, either by the individual himself, by his attorney and ultimately by an Examiner in the Patent Office to whom the application has been assigned.

Those familiar with the different phases of the pulp and paper industry, or any other industry, have a pretty fair idea as to what class or group he

is apt to find patents along the lines of the invention submitted, and there is selected from this and other groups all of the patents which seemingly have a bearing on the particular invention under consideration.

One of the greatest single sources of technical and scientific information is contained in the Patent Files at Washington. Anyone who does not have a complete and up-to-date file of all patents which relate directly or indirectly to his particular business, is overlooking a valuable business asset.

With these patents spread out before one, a general idea can be immediately had as to the novelty of the invention, and whether or not any one single prior issued patent discloses or covers most or all of the novelty of the invention being considered.

If such is found to be the case, the Patent Office will, if the case gets that far, deny the applicant a patent on the grounds that a certain patent anticipates the invention of the applicant.

Rarely does a competent attorney allow this to develop, as before even starting to prepare the application, the attorney will have or will obtain a complete file of all the related art and make up his mind whether or not, first, it is worth while to file an application at all, and second, just how limited the application must be in order to steer clear of prior patents.

The principal difficulty in determining whether or not a new patent should be issued, and the only real difficulty is when no one issued patent completely covers the inventive idea, and where two or perhaps several patents must be added together in order to show this idea, in whole or in part. Right here comes the most difficult question to answer, either by the attorney, or by the Patent Office Examiner, or by the court should a patent be issued and subsequently get into litigation.

The question which must be answered is, in the terms of Patent Office procedure, whether or not "any one skilled in the art" could have taken the patents previously issued, and accomplished the result obtained by the inventor.

In other words, to one having a general knowledge of a particular industry or part of an industry in which the patent application falls, would it be fairly obvious to him by reading previous issued patents to have arrived at the inventor's result.

If it is reasonably obvious that such would be the case, then the Patent Office will properly deny the inventor a patent.

If, however, it is not obvious that anyone reading the prior patents would have arrived at the inventor's result, then the Patent Office can very properly grant the inventor a patent on his particular idea even though it may be limited somewhat by prior patents.

Right here comes the "hindsight" danger frequently referred to by jurists, for when one knows the answer it is much more easy to reconstruct the method by which the answer was obtained.

However, when it is obvious that some real accomplishment has been obtained by the invention, and that years have elapsed since the issuance of the patents which might possibly anticipate the invention, and that several individuals were working to accomplish the result which the inventor succeeded in accomplishing, then it is quite obvious that the information given in issued patents was not sufficient so that anyone skilled in the art or a good mechanic could have accomplished the thing which the inventor did accomplish. Consequently, then we must assume that the inventor created something new and is, therefore, entitled to a patent.

In theory at least it would seem that it would not be a too difficult or lengthy job to determine whether or not any new idea is patentable. Practically, we seem to have arrived at a point in our patent procedure where such a determination is much more complicated.

▶▶▶ Anyone who has tried to figure out how to make out their income tax, or how to fill out some of the priority forms, can perhaps appreciate what could and seemingly has happened to our relatively simple early patent procedure.

Someone has said that half of our lawyers are in Washington or someplace writing laws or rules, and the other half are frantically trying to find out what the first group really mean and to tell the public what it is all about.

The author suspects that something of this sort has happened to our patent procedure through the years, and we now find that even in order to obtain a simple patent, that there are a multiplicity of rules and regulations which must be considered and followed, hence, we have to get a patent lawyer to tell us how to do it.

It seems we have in this country at this time several thousand men who are practicing patent law in one way or another. Many of them are filing patent applications, corresponding with Patent Office officials and interviewing members of the Patent Office staff. In this group there may be several hundred different ideas of just how the Patent Office ought to be run, and just how the Examiner ought to act in allowing claims. It is small wonder, therefore, that Patent Office Examiners occasionally seem to get fed up with the whole thing, and give us actions, or "office letters" as they are called, which are not too logical in their reasoning or not too wise in their selection of anticipating patents.

▶▶▶ At the present time, the situation in the Patent Office is, of course, complicated by the war, and the staff has been depleted the same way as has every other organization. We must also realize that many of the newer men in the office, while having a good background of law, and training, are quite inexperienced in the mechanics of patents and particularly the features of the patents and processes which they are trying to judge. This is of extreme disadvantage to the Patent Office staff, and one which can only be overcome by the attorney or the inventor educating the Examiner in the particular features of the art with which he is immediately concerned. Most Examiners welcome an interview of this kind, and particularly exhibits or models which will explain the matter clearer to them.

Occasionally we find in the Patent Office, as we would find anywhere else, men who seemingly do not appreciate what the inventor or attorney is trying to do or any effort they may make to educate or assist him, and will take an argumentative or contrary attitude, seemingly entirely in self-defense. This, however, is more or less a rarity, and can usually be corrected by appealing to someone higher in authority, or going to the Board of Appeals or the Commissioner himself.

While there may be some tendency to rubber stamp the decisions and determinations of those down the line, still if one has a real case, he can usually get an adequate hearing before some of the office tribunals. Failing in this and believing that he has a just case and that the Patent Office is not treating him rightly, he can always appeal to the Federal Courts.

▶▶▶ The pulp and paper industry, while one of the oldest industries in existence, still has many aspects which it is not easy to catalog on a strictly scientific basis. In other words, it is still an "art."

This fact in itself makes the preparation of patent applications particularly difficult in many cases, and even though they are carefully and competently prepared, it is frequently difficult for the Patent Office Examiner to get the viewpoint of the inventor. Patent Office officials are at a disad-

vantage because they are seldom in a position to see and observe the results or working of the invention, except in such limited way as the inventor may demonstrate in the Patent Office at Washington or Richmond.

Many of the Examiners in the patent office have never seen a modern pulp or paper mill, yet they must pass on the many features of machine designs, processes, and methods, very largely by reading the words of the inventor, and reading the words of prior inventors. When the Examiner has any doubts regarding any particular invention, he will almost invariably decide against the inventor.

After the Examiner has analyzed the invention, and has selected from his files those patents which either anticipate, or come closest to anticipating the invention, he then tells the inventor his decision.

If the patents selected by the Examiner are, in the main, known to the inventor, and the Examiner has not found some patent which the inventor had overlooked, and which pretty completely anticipates his invention, he may still reject some or all of the claims applied for. Then the inventor, through or with his attorney, argues his case with the Examiner, either by correspondence or in person.

If he makes out a good and reasonable case, the Examiner will, very probably, reverse himself in whole or in part, and agree to allow the inventor certain claims. If an agreement is arrived at between the Examiner, inventor, and attorney, then the patent can be brought immediately to issue.

If, however, they cannot agree, the prosecution continues until the Examiner indicates by final action or letter that he has finally made up his mind. Prosecution may then continue through the various other tribunals of the Patent Office, or into courts outside the Patent Office. In only a limited number of cases, however, is such a procedure found necessary.

If what I have said does, in any way, awaken the industry to at least a consideration of their particular developments from a patent standpoint, and dispel any idea that our patent system and its value is any different or any less now than it was 25 or 50 years ago, I shall feel that my effort has not been entirely in vain.

Acknowledgment—The author wishes to acknowledge the articles and writings given in the bibliography as the source of certain of the data here presented. Also the assistance and information by Honorable Conway P. Coe, United States Commissioner of Patents, Honorable J. T. Mitchell, Commissioner of Patents for Canada and the Paper Makers' Association of Great Britain and Ireland is greatly appreciated.

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The Electron Tube— Genie, Gremlin, or Jeep?

W. D. COCKRELL, Engineer
Electronics Section, Industrial Control Division
General Electric Company

▸▸▸ THE AVERAGE INDUSTRIAL ENGINEER, unfamiliar with electronics, who glances through almost any magazine today, technical or popular, is apt to be overawed by the promises of electronic things to come. It is quite likely that his first impression will be that the electron tube is nothing short of a genie straight out of the Arabian Nights — a superhuman spirit of fantastic complexity and far too elusive for the average mortal to comprehend.

Or he may take the opposite viewpoint. These odd looking electron tubes must fit into a class with the gremlins, mischievous little sprites, capable of much good, but more evil, and definitely to be shunned for as long a period as possible.

But on closer acquaintance, this electron monster loses most of its frightfulness, and turns out to be a friendly little jeep, rugged and reliable, capable of taking a terrific beating with minimum attention, while doing a man-size job.

Like the jeep, the electron tube can do its job 100 per cent, but it cannot win the war unless the rest of the army pitches in to do its share. The rest of the "army" consists of the infantry of rheostats, transformers, and capacitors; the artillery of motors, generators, and amplidynes — all old friends, but perhaps not so quickly recognized under the speeded-up operations of this new mechanized warfare.

So let's all be good sports and not be too quick to condemn this electron "jeep" if the whole show does not come off as scheduled. Perhaps the break occurred at an entirely different part of the front. Did you ever shoot trouble for an hour and then find a blown fuse? That has happened on electronic panels, also!

What Are Electron Tubes Anyway?

Are tubes hard to understand? Anyone who understands the use of the simplest copper-oxide rectifier, the rheostat, and the direct-current voltmeter, can become a tube expert after one easy lesson — well, anyway, he'll know as much about an electron tube and how it functions in an industrial circuit as many of us need to know.

In the first place, every true electron tube is a rectifier — composed of at least two elements or electrodes enclosed in a vacuum envelope made either of glass or of metal. One of the two principal elements of each tube is called a "cathode." The cathode is made of special materials, and is heated, usually by a small electric heater, to release electrons — those fundamental particles of negative electric current.

Once, in the dim, dark past of high-school physics, we learned that anything charged positively attracts a negative charge. Then, in the next lesson, we learned that if the charge is negative, other negative charges are repelled. Thus, if we connect the other principal tube element, called the "anode," to a power source so that it is positive with respect to the cathode, the anode will attract the electrons from the cathode. But if conditions are reversed, and the cathode is positive and the anode negative, no electron flow will take place, because the anode is so made that it will prevent the loss of electrons. Thus, we get the one-way valve action of rectification; the electron flow (or the negative current flow, if you like to think of the normal current flowing from positive to negative) can move in but one direction through the tube—namely, from cathode to anode.

But that is not all. In these days of commando tactics, we are taught that it is most effective to kick a guy when he is off balance, or sock him when he is not looking. In a similar manner, if we can catch the current passing from cathode to anode in its simplest state, as a stream of electrons, we can control it with the greatest of ease. For instance, the electrons in an ampere-second of current weigh about a billionth of an ounce, something a lot easier to push around with a small control power than even the smallest and lightest switch or contactor. The control element added to the electron tube for this purpose is called a "grid," which is usually a spiral or grate of fine wires placed between the cathode and the anode. If the grid is held at a negative potential, with respect to the cathode, it tends to repel the electrons passing by it on their way to the anode, thus cutting down the flow of current, or possibly preventing it altogether. So long as the grid is negative, it pushes the negative electrons away, and thus collects no electrons to itself. No electrons means no current, and no current — even with a large impressed voltage — means no power. And to be able to control current without the use of power is a neat job!

Of course, if we make the grid positive, it will assist the flow of electrons to the anode and a larger current will flow, but only at the expense of some electron current to the grid. With the grid negative we can have control power for next to nothing.

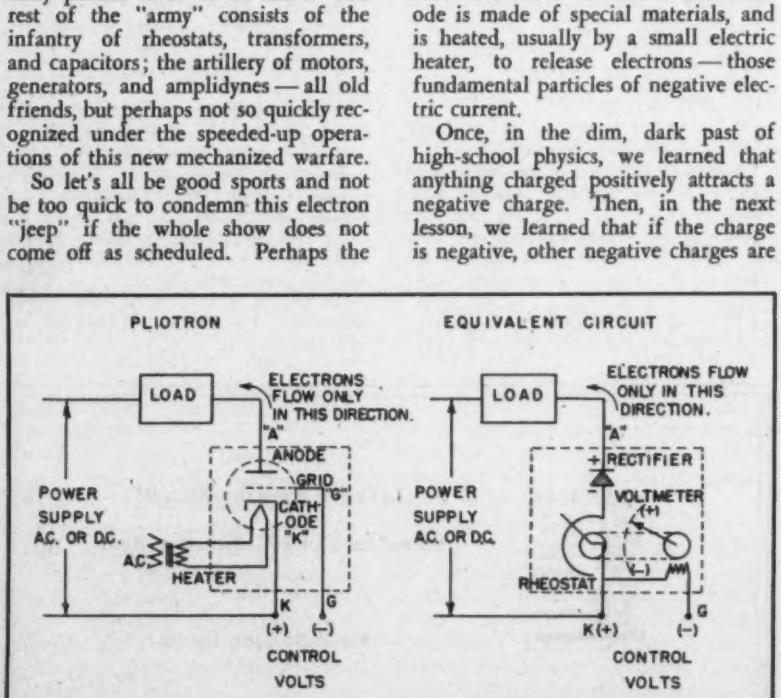

Fig. 1—Pliotron operation and control. Current is usually in milliamperes.

TYPES OF TUBES

The electron tubes that are used in industry may be divided roughly into three groups: phototubes, high-vacuum tubes, and gas-filled tubes.

Phototubes

A phototube is rather unique. It is a simple two-element rectifier in an evacuated glass bulb. The cathode is not heated to release the electrons, but

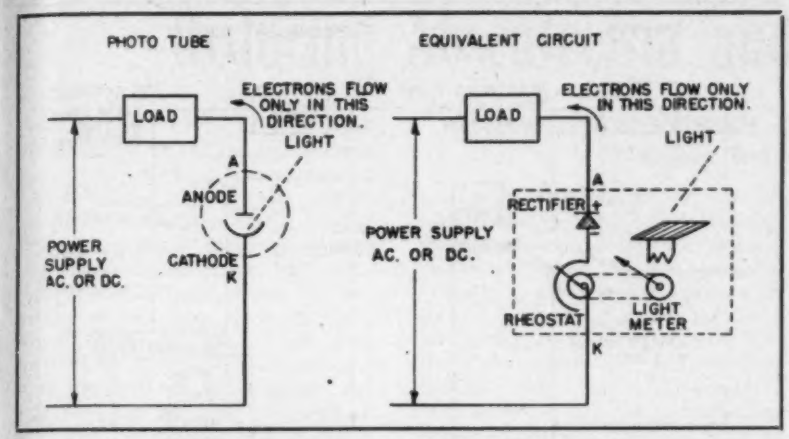

Fig. 2—Phototube operation and control. Light controls a flow of microamperes.

is made of material which releases or "emits" electrons as light strikes it. These electrons can then be attracted as a small negative electric current to the positive anode. You might have guessed that the number of electrons which should be kicked out of the cathode material when light strikes a small cathode would not be very large; you would be quite right. We are lucky to get a millionth of an ampere, in most cases; and under certain conditions, the current is much less. In fact, the output is so small that in order to make use of it, we must boost it up or amplify it with a pliotron or thyratron, in order to operate even the smallest practical relay or motor.

Phototubes are the "electric eyes" of industry. Responding to a shadow or a flash of light, they may be used to count people, food, freshly painted articles, and other things which it is not desirable to touch, as well as to perform many other simple switching applications. In more advanced equipments, they can check or compare colors, read high temperatures, and control very rapid and accurate movements through the weightless and wearless light beams. The potential uses of the phototube are limited only by man's imagination.

High-Vacuum Tubes

Vacuum tubes which are simple rectifiers, and which have but two principal elements — the electron-emitting cathode and the collecting anode — are called kenotrons, or "diodes" ("di" indicating two). If we add one grid for the control of the electron stream, it becomes a "triode." All high-vacuum tubes with one or more grids are called pliotrons, or simply, amplifier tubes. Sometimes they are referred to by their function, such as transmitters, oscillators, or converters. If more grids are added in the electron stream to control the flow, as series valves in a pipe, the tubes may be called tetrodes (four-element, two-grid), pentodes (five-element, three-grid), etc. The typical vacuum tube is a low-current device which has a comparatively high voltage drop within the tube, yet it is capable of extremely fast and continuous control of the current with minimum grid power.

The pliotron is the familiar tube in radio receiving sets. Its role of amplifying a small signal or supplying a small output power is just as useful in industrial devices. Because of its characteristic of continuous control at extremely high frequencies, in the larger sizes it is used to supply the many kilowatts of power required for large broadcasting stations, or for induction and dielectric heating.

GAS-FILLED TUBES

Gas-filled tubes, if used as rectifiers only, are called phanotrons; if they contain control elements, they are called thyratrons or ignitrons.

Thyratrons

A thyratron tube has a hot cathode to emit the necessary electrons, and a grid to prevent current flow, when desired. However, it also contains mercury vapor, obtained from a drop or two of mercury in the tube, or it may contain inert gas, such as argon or xenon at low pressure. The gas or vapor helps to cut down the high internal voltage drop found in the pliotron. A constant voltage drop of about 15 volts is held for any value of current within the ability of the cathode to supply electrons. (This is done by a process called ionization.)

Because of this low drop, a thyratron of a particular size can be rated for a continuous current of 10 to 20 times that of a pliotron of the same physical size. Thyratron current ratings run into amperes; most of the pliotrons with which we deal will carry continuously only a few milliamperes.

But gas filling does have a few drawbacks. For instance, the maximum voltage of the controlled circuit is limited, but it is still well above the usual industrial control voltage range. Of more importance to us is the fact that the gas prevents the grid from controlling the current after the flow has once begun. In other words, a negative grid will prevent the flow of current as the anode is made positive; but once it has permitted the electron arc to start, it is powerless to stop it. The current can then stop only as the anode power is removed, or, in any a-c. circuit, during the a-c. voltage negative cycle. Even then, the deionization time required to regain control may be approximately a millisecond; therefore, thyratrons do not operate at frequencies much greater than the commercial power frequencies.

The thyratron is the handy-man of the industrial tubes. It controls motors, energizes magnetic contactors, and supplies small amounts of heat whenever accurate control or high-

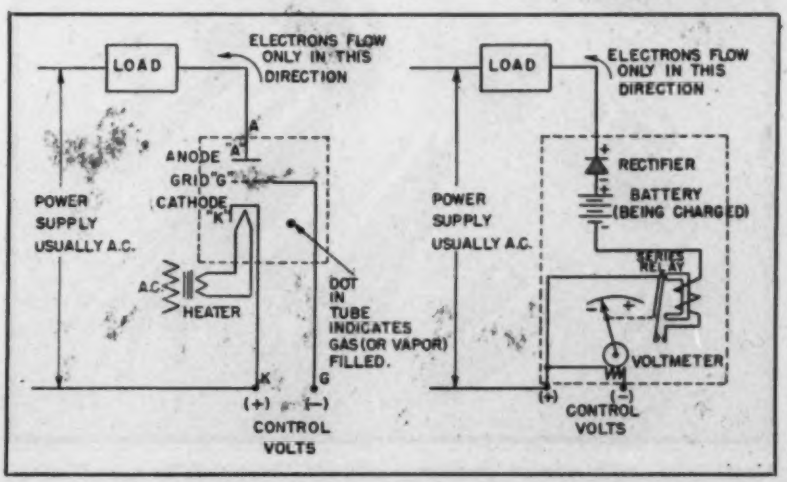

Fig. 3—Thyratron operation and control. Current rating is usually in amperes.

speed operations are required. Operating indirectly, by controlling generator fields or saturable reactors, it can control large amounts of power — many hundred horsepower or many kilowatts — for heat or lighting.

Ignitrons

The ignitron tube is similar to the thyratron in that it is a gas-filled tube, but it differs in that its cathode is not heated to free the electrons. Instead, its cathode is a pool of mercury and its electron-emitting energy is derived from the arc stream itself. This is a cumulative action — the larger the current the more electrons are made available.

Thus, the instantaneous current capacity of the ignitron is limited only by the size of the elements and the leads to carry the heavy current. This may be thousands of amperes. The continuous current rating is determined by the ability of the tube to dissipate the heat losses. The larger sizes of ignitrons have built-in water jackets through which cooling water is circulated.

Since the ignitron, unlike the thyratron, does not have electrons immediately available at a hot cathode, its control element, the "igniter" — a pointed piece of crystal dipping into the mercury pool — must actually "blast" a few electrons loose from the mercury to start the arc stream. This requires real power; as much as 40 amperes at 200 volts, for a few microseconds. So it can be seen why the ignitron is most practical for high currents and large power requirements.

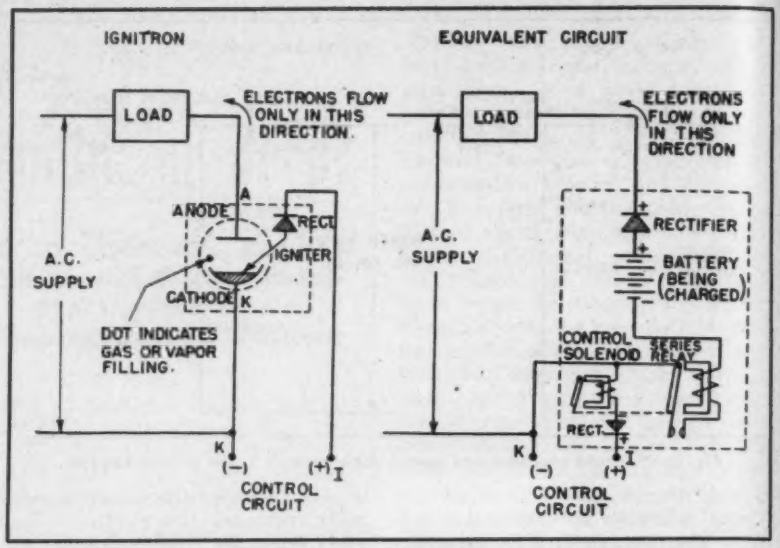

Fig. 4—Ignitron operation and control. Current may be hundreds of amperes.

Ignitrons are the heavy artillery of the industrial tubes. They are called upon to control the thousands of amperes required for resistance welding. They rectify and control the large amounts of power needed for the manufacture of aluminum, in electrochemical processes, and for steel mill and factory direct-current shop voltages.

To sum up briefly: The phototube, using the energy of light to release electrons from its cathode, has so small an output in microamperes that a pliotron or thyratron must be used to amplify it to a useful value. The output of the pliotron (milliamperes) is sufficient to operate small relays, or to control a thyratron. Thyratrons, in turn, control amperes to operate large contactors, or motors in the usual control sizes from fractional horsepower up to 5 horsepower or more, or to control ignitrons. Ignitrons can handle hundreds of amperes, but require a reasonable amount of control power for operation.

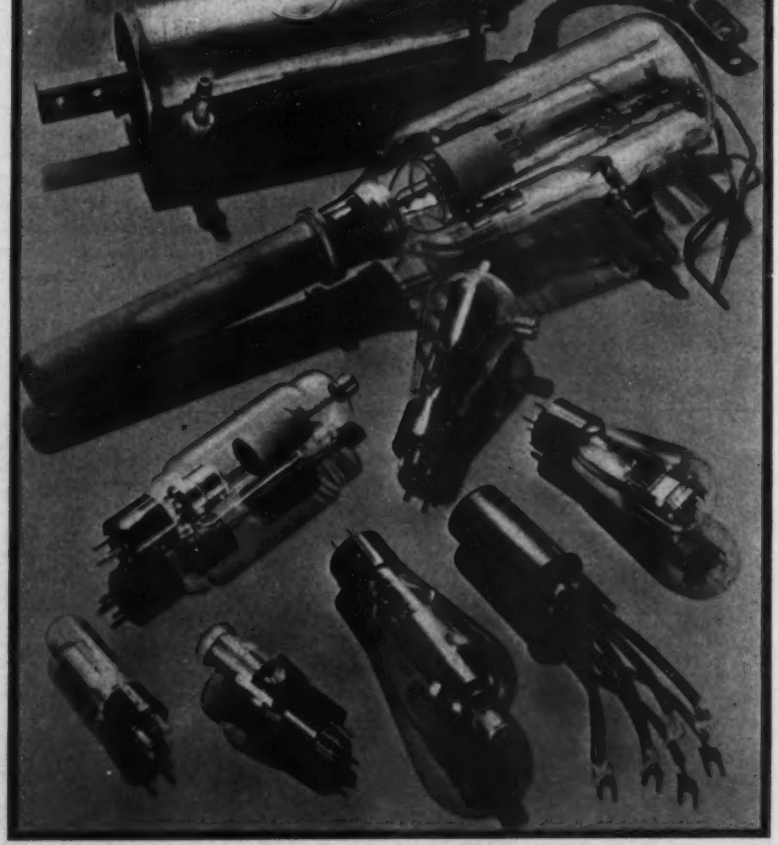

Fig. 5—Tubes used in industrial electronics equipments. Included are the ignitron, pliotron, kenotron, thyratron, phanotron and phototube.

How the Tubes Work

We said before that anyone who can understand a rectifier, a rheostat, and a voltmeter can understand tubes. Now we will prove it!

Take any kind of rectifier — copper-oxide or selenium — anything that will pass current in one direction and stop it in the other. Connect a rheostat in series and drive it by a voltmeter element, the positive terminal

(Concluded on facing page)

Reducing Absenteeism and Turnover

LAWRENCE STESSIN, Chief, Industrial Relations
Labor Relations Institute

▶▶▶ LIKE MANY OTHER EMPLOYERS in the civilian goods industries, papermakers are keenly aware of the fact that the more dramatic appeals for perfect attendance on the part of workers apply only indirectly to their own employees. It is true that paper and paperboard are essential war materials; anyone who reads the daily newspapers knows this. Bomb racks are made of paperboard; Garand rifles are wrapped in waterproof paper; and tons of blueprint paper are used in specifying battleships, planes and various types of ordnance. But the fact still remains that paper mills and paperboard plants still suffer from excessive turnover and absenteeism, as no panacea can be found in the "thumbs up for Victory" appeal.

Also like most other employers—both in war industries and in less closely related fields — papermakers must face the fact that there *is* no single cure for absenteeism and turnover. More complex treatment is required to eradicate these twin maladies afflicting sustained production. The remedy really begins with a proper diagnosis—that is, investigation of the underlying reasons why paper mill employees take days off without permission, and why they give up papermaking to enter other fields.

There was a time when employers solved their absenteeism problem by simply making a rule. If John Jones failed to report so many times in such-and-such a period, he simply took the "or else" and found himself another job—if he could. But now the tables are turned, and the papermaker—like the plane manufacturer and the shipbuilder—finds himself facing quite a different situation. The problem today is not preserving discipline through disciplinary methods, but rather one of removing *causes* which tempt employees to deviate from the rule.

Absenteeism in a paperboard factory, for instance, where the operation is continuous, and the machinery runs without pause for as long as 6 or 12 days without stopping, can be much more serious than in a plant of a different type. There is also a relatively small number of workers, so that operations are badly affected if only a few stay out. Of course, this situation is balanced to some extent by the fact that paper manufacture, generally speaking, has not undergone the terrific expansion which has caused other industries to rely so heavily upon new and untrained labor. There are fewer "floaters" and a lesser reliance upon women employees. But it is true that transportation breakdowns, housing difficulties, school problems and other problems which lie at the root of absenteeism still affect the paper mill. So, like the arms plant down the river, the paper manufacturer must delve into the reasons why workers lag in their attendance.

Checking Up on Causes of Absence

The initial step in determining the reasons for absenteeism is to organize the procedure for letting the employee return to his job. Never wait until the payroll figures come through to be informed that Henry Brown was out on Monday. The time to act is when he reports for work on Tuesday. You must have some automatic, impersonal machinery for making Jones *apply for re-admission*—some dependable technique for making him state his reasons before he is allowed back to work. The Field Staff of the Institute has developed a procedure which gets results, and it works in the following manner:

When Henry Brown fails to show up for work, remove his time card from the rack and replace it with a colored card which notifies the worker

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The Electron Tube—

of which is connected to the negative terminal of the rheostat. Gear the rheostat to the voltmeter element in such a way that more negative voltage will cut in more resistance (Figure 1). The rheostat is stepless, and goes to infinite resistance or open circuit at the high end. It is assumed that the voltmeter and rheostat can move extremely fast, 100,000,000 times per second; and the voltmeter is of extremely high resistance, perhaps a megohm or more.

This simple circuit can be used to replace a triode pliotron in any industrial circuit, and will do exactly the same job. If the tube is a tetrode or pentode, other series rheostat-voltmeter combinations may replace each grid. Nothing particularly tough about this circuit, is there?

Would you like a phototube? Then simply replace the voltmeter with an exposure meter so that increased light on the sensitive surface will move the meter element to cut resistance out of the rheostat (Figure 2).

As for the thyratron and ignitron, they are no more complicated. In series with the rectifier we'll place a battery of about 15 volts and so connect it that it will be charged by the current which the rectifier permits to pass. (This corresponds to the constant arc drop of the thyratron for all current values.) Finally, in the circuit is a series relay that is connected to "seal-in" or "lock-in," when the circuit is completed through its own single, normally open contact. The relay armature is moved, and this contact is closed mechanically by the action of the control voltmeter (just as the rheostat turned, in the description of the pliotron). The contact moves to close as the voltage becomes less negative (Figure 3).

Once the contact has closed, however, the holding power of the series relay is so great that the small voltmeter torque is powerless to open it again until the current has stopped flowing.

The ignitron equivalent is about the same, except that we must remember that we are dealing with larger power, and the size of everything becomes larger. In place of the voltmeter, we can use a small solenoid. A rectifier in series with the solenoid, to permit current to flow in but one direction, may not be necessary in our electromechanical picture, but it is necessary in the ignitron circuit to prevent injury to the igniter by reverse current, so we'll put it in to make our picture complete (Figure 4).

And that completes our one-lesson course on the industrial electron tube. We do admit that a few of the details about as essential as trouser cuffs and pocket flaps, have been omitted. But the fundamental facts are here, and we would like to prove it in this way. If you ever run into a wiring diagram that features one of these mysterious electron tubes that has been worrying you, do this: Before you lose any sleep or even get a vitamin "B" deficiency, just tear off a piece of an old war bond or ration book, paste it neatly over the offending tube symbol and draw thereon the appropriate equivalent symbol in a bold and steady hand. Then go right ahead and forget that electrons exist.

that he must go to the Personnel Department to get his card. This, of course, is a procedure which applies only in cases involving an unexcused absence. The employee takes the notice—which can be printed at the top with "AWOL" in bold letters—to the proper executive, either the plant superintendent or the employment manager, who examines him regarding the reasons for his absence. If his excuses are satisfactory, his time card is returned. The information so obtained should be written down and made a part of the employee's permanent record. Then if the absences continue, the evidence is there to justify a discharge. (The same record, in cases of good or perfect attendance, can be used to justify merit increases, too.)

Once the reasons for absenteeism have been uncovered, management usually can do a great deal to eliminate them. For instance, many companies have reduced absences due to excessive drinking after payday by convincing tavern keepers that it is good business not to oversell paper-mill employees. There are opportunities for effective pressure in the fact that so many taverns violate the law through serving drinks to intoxicated persons, or through maintaining gambling machines. And, of course, no tavern keeper cares to hazard his license.

"Illness in the family" is one of the truly valid excuses which has been invoked more frequently than in the earlier days of the War. So many doctors have been called to the Armed Forces, and so many of the women in every neighborhood are working, that the employee whose wife takes sick is really on the spot. A community nursing service is a good thing to have when illness strikes. Are you helping to maintain something of this sort in your community?

Working Conditions Affect Attendance

Working in a pulp or paper mill—especially in some department where chemical fumes, dust, or high temperatures, and possible high humidities are disturbing factors—is not the pleasantest job in the world. It does not malign the industry to say that there are nicer places in which to spend one's time—places in which good light and ventilation, dry air and relative quiet help to make the employees feel at home. Continuous operation encourages sporadic eating, instead of regular habits. And it is hard for the individual employee to maintain proper standards of cleanliness.

Old-timers in the industry may cry "So what?" But the record shows that there is a direct relation between clean, comfortable surroundings and regularity of employment. Nobody advocates putting papermaking into the same physical class with the processing of foods, where every hygienic measure is rigidly enforced. But it still holds true that paper industry employees are human, and that they appreciate sanitation, clean wash rooms, and other minima of comfort. The mill with plenty of shower baths is more apt to have a good attendance record than the one from which workers must drive home unbathed.

Grievance Machinery Is a Positive Aid

There is no such thing as a grievanceless mill, however well the "boss" is acquainted with the workmen. Even the smallest factory should have some impersonal setup for handling grievances—and even the smallest complaint is worthy of attention. The "gripe" which has no avenue of expression tends to swell, and the merest trivialities, if unattended to, may cause some work stoppage before they come to light.

Tie in Vacation Pay with Absenteeism

Now that so many companies are giving extra pay instead of vacations, the firm which connects this system with good attendance stands a good chance of correcting absenteeism. The Institute recommends the following policy, which can be inserted as a clause in the union contract, or placed on the bulletin board in non-union mills: (Get War Labor Board approval before putting the plan into operation. File Form 10.)

Each employee who shall have been continuously in the employ of the company for one year prior to the vacation period shall receive a week's vacation with pay at 40 hours at the straight-time hour earnings. The vacation period if granted shall be between June 1 and September 1.

The word "continuously" as used in the above will mean that the employees shall have been in the employ of the company for the period specified.

However, for every 40 hours of work lost by the employee from the hours of his regular work weeks, five (5) per cent of the vacation pay will be deducted by the company.

Hours lost by the employee for bona fide sickness or accident shall be counted as hours worked within the meaning of this paragraph.

"Job Shopping" Is a Cause of Absenteeism

One of the most frequent causes of absenteeism is taking time off to look for another job. At first glance, there might appear to be little that the paper mill executive can do to counteract the drain of manpower into war plants, but many a worker who is on the verge of "making a change" can be shown that his net gain from the shift might be smaller than he expects—particularly if changing jobs means moving to another locality, where housing and schooling are not as good. Postwar conditions are a pertinent factor: there will be no conversion period in the mills making paper and paperboard. It is not unpatriotic—considering the war job now being done by the industry—to point out such matters whenever the opportunity arises.

Don't wait until the "exit interview" to put these arguments across—but be sure to review them in detail when the man who is leaving comes in to pick up his final pay. Institute surveys prove that the exit interview is one of the most effective ways to reduce turnover. Through this device, management not only gets a last-ditch chance to dissuade the worker from quitting, but also has an opportunity to learn such things as:

1) Whether or not the mill's grievance machinery is functioning as it should.

2) What dissatisfactions bother the employees most.

3) Whether workers are being lured away by other firms.

4) Whether supervisors are discharging workers for petty or personal reasons.

5) Whether certain personnel practices or plant rules are misunderstood.

6) Whether local conditions outside the mill, such as housing, crowded schools, inadequate transportation, etc., are making other localities seem more desirable.

Anyone who can handle men can conduct an exit interview, which is nothing more or less than a friendly conversation. Few workers resent such interviews, and the man "with a chip on his shoulder" usually welcomes the opportunity to sound off. Institute members who have made them a steady practice find that exit interviews cut turnover as much as 30 per cent—with a corresponding decrease in absenteeism.

Basically considered, the same reasons underlie absenteeism and turnover, and most of the causes can be corrected or removed by management—if it will seek out the *facts* and be thorough-going in its treatment. The fundamental cure of both "diseases" is an eagerness to meet the workers half way in overcoming conditions that bother *them* as much as the ultimate effects disturb the mill which employs them.

A Papermaker Looks at Postwar Planning

H. M. GRASSELT

▸▸▸ INDUSTRY'S RETURN TO PEACE will bring about a period of readjustment, necessitated primarily by changing from war materials to products of commerce and civilian needs.

The length of this period of readjustment cannot be predicted at this time. Numerous problems will come up after the cessation of hostilities, and they will play an important part in the revamping of industrial life.

There will be two periods of transition — one after the defeat of Germany, the other after victory has been won over Japan. It seems that such a gradual change, taking place at two distinct periods, should prove very beneficial and prevent a severe and lengthy slump in commerce and employment.

The paper industry will not remain unaffected by coming events. Here, too, will be definite periods of readjustments.

The present conflict has created abnormal demands for all grades of paper and has given a great impetus to the development of specialties for specific war purposes. After the battle is won, the demand for these materials will decline or may even cease. Government orders for printing paper, map and chart papers, etc., will decrease in volume and there may be cancellations of contracts.

To meet such contingencies, paper manufacturers and converters should adopt a postwar planning program and prepare now for the approaching industrial readjustment. This program should embrace research into machinery and equipment, manufacturing processes, raw materials, selling and distribution methods, costs, personnel and exports.

Machinery and Equipment

Heavy war orders and uninterrupted operations for the last two years, together with the inability of obtaining repair supplies and replacements, have in many plants created a rather precarious condition. New installations and extensive repairs and replacements will be necessary as soon as time and materials are avaliable. Since the transition from war to postwar conditions may be a progressive one, the manufacturer has an opportunity to also progressively achieve a rehabilitation of machinery and equipment.

Manufacturing

New developments in other industries will bring about a demand for specialties, new types of paper and paper goods, that differ in physical and chemical structure from present grades. The taste of buyers and consumers, too, has undergone changes.

A thorough study of manufacturing facilities, required raw materials, sales prospects, etc., has to precede experiments on new lines. The manufacturer has to be reasonably sure that the contemplated specialties or new types of paper fit properly into his setup and can be produced at a profit.

The manufacturing department has to work in close co-operation with the laboratory, in fact, to depend to a very large extent upon the latter's research work. There have arisen many new questions on raw materials, especially in mills that use cotton rags. Many of the cuttings of materials used by Army and Navy (civilian use not excluded) have been impregnated and treated with chemicals, paraffin and similar substances, that cannot be eliminated by the ordinary process of cooking and bleaching. Furthermore, many new fast colors have been introduced, adding greatly to already perplexing bleaching problems.

Postwar developments in the textile industry no doubt will increase further the use of chemicals and fast dyestuffs in fabrics and thus add further to the burden of the papermill laboratory.

Sales and Distribution

It is a well-known fact that sales imagination always can find new and profitable markets when old ones show signs of saturation or weakness.

After the war, sales managers will be confronted by many new problems and situations. Demands for new types of paper have to be met, and standard grades may become obsolete and require the introduction of suitable new stable lines.

The new sales policies must be established in co-operation with manufacturing and research departments; the management must know that sales will be profitable and lasting.

A steady and uniform flow of sales depends on a definite policy of distribution. "Hit or miss" sales and service methods must be avoided, but it also must be understood that service to be lasting must yield an adequate return to the manufacturer.

Sales and distribution must be assisted by well-planned advertising campaigns in the right media as well as direct mail and sales promotion activities. Manufacturers who sell through wholesalers must support the latter's efforts by advertisements and by having mill representatives work in conjunction with their salesmen.

It is obvious that sales and distribution policies have to be determined by an analysis of certain factors, such as: (1) Markets by territories; (2) supply and demand; (3) possibilities for wider distribution; and (4) correct interpretation of existing business conditions and prospects for the future.

Every mill has lines that yield little or no profit, but have to be carried as a matter of policy. A gradual reduction of such lines, if a more economical way of manufacturing cannot be found, is, of course, advisable, and sales activities are to be directed accordingly.

There is always room for simplification and further standardization of lines and grades. While there has been a considerable elimination of various sizes, weights and colors, there are further possibilities along these lines. A closer co-operation between manufacturers and converters, printers and other users of paper will bring about a better understanding of their respective problems.

To meet changing conditions, the manufacturer must be of maximum service to the consumers of his product. Promises must be kept and deliveries must be made according to arrangements.

It is obvious that the sales department and the cost department are inseparably linked within the organization. To stay in business, the sales department must have accurate information on the cost of the various items.

Cost Accounting

Cost accounting must receive a new impetus and assume an even higher importance in postwar management. Doubtlessly, manufacturers again will be confronted by keen competition after some or all of the Government restrictions have been removed and "free enterprise" re-established.

Let it be hoped that cut-throat competition remains a thing of the past, and manufacturers will insist upon a fair return on their investments.

The individual manufacturer cannot and does not dictate market prices. They are established by the law of supply and demand and industrial conditions in general. Consequently, the manufacturer whose plant has achieved the highest efficiency in plant management, sales and distribution, will re-

alize larger profits than his competitor who is handicapped by poor organization and inadequate or antiquated machinery and equipment. The latter can progressively correct these detrimental features. However, under no circumstances should the effort be made to offset losses or rather to eliminate them by changing to inferior raw materials by permitting carelessness in finishing processes and by general deterioration of quality.

A well-functioning cost department will point out all weak spots in the various phases of manufacturing and pave the way for the adoption of corrective measures. It will show a way to render all operations as economical as possible.

Personnel

It is quite possible after the war that piece work rates, bonuses or group wage payment plans, will remain or be used on a far larger scale than today. Certainly, every industrial establishment should have a definite incentive program for rewarding workers for increased efficiency. Hourly or daily wage rates neither provide such a feature nor stimulate greater efforts on the part of the working force.

Certain operations in paper mills and converting plants cannot be covered by piece rates. However, in such instances, a bonus system or group incentive plan can be worked out to the benefit of both employees and employer.

After the War and its incident abnormal demand for goods, buyers again will insist upon standard quality, better packaging and keeping of promises.

Proper training and co-operation between departments and individual employees contribute a large share to the welfare and success of a concern. Lack of manpower because of the war has led to many slip-shod habits and methods which no employer would tolerate under normal conditions. Heavy labor turn-over and a certain "I don't care" attitude among many employees have been responsible for poor production and carelessness in sorting, packing, etc.

Many employees will have to be re-educated so that they may again appreciate and take pride in quality and careful work. This program will be expedited by the nucleus of loyal and skilled employees left to the individual organization.

The responsibility for some of the conditions or for poor work that has been turned out cannot be placed on the employees alone. Rather lack of time to train new employees properly, pressure to get out orders, poor raw materials, etc., may be equally or more to blame for these shortcomings than labor itself.

During these trying days of endless labor turn-over, breaking in of new help or working "short-handed," the old guard and foremen have done a splendid job in keeping things rolling. In spite of all handicaps, they have kept their respective organizations together and have overcome many obstacles.

Export

Postwar planning also should consider export possibilities. In reality, exporting furnishes an outlet for surplus production or takes up the slack created by seasonal slumps in domestic business. The fine paper industry, for instance, always has had certain periods of slackness. Such conditions may reappear in postwar days.

To establish export business is one way to arrive at and maintain a balanced flow of production and shipments. A mill endeavoring to enter the export field, therefore, should set aside a certain percentage of its production for such an outlet in its sales and production planning program.

After the cessation of fighting, it is to be expected that the Government will continue to exercise some sort of control over exports. This control probably will continue until conditions in foreign countries become more stabilized and rehabilitation of war-stricken territories has made some progress.

There are two principal methods of doing export business. One method is to establish direct business relations with foreign buyers; the other, to sell through domestic export houses.

To sell and ship direct to foreign buyers is costly and requires a good deal of missionary work. In order to succeed, the manufacturer must study foreign markets and find out where he will find a sufficient initial demand for his goods.

A "commercial missionary" who speaks the language of the respective country fluently, who knows its people, and is acquainted with buyers, has to gather customer requirements data firsthand.

Tastes and preferences differ with different countries just as much as with individuals. Many products, popular in the domestic market, may not find favor in Latin America or elsewhere. There are definite grades of paper, especially stationery, decorative papers, etc., to meet local and climatic conditions.

Some of the Latin American republics hold very attractive possibilities for paper manufacturers and converters. Rapid development in agriculture, industry and commerce in these countries create increasing demand for paper of all descriptions.

However, the market for the most part is confined to the large cities.

In the large cities (which, by the way, are more European than North American) are branches of American banking houses and chambers of commerce. These offices are ready at all times to aid American firms in studying export problems.

Many European exporters use the services of "resident foreign agents." These agents are not buyers, but are salesmen who receive a commission on sales.

The foreign agent has intimate knowledge of the language of the country in which he operates, the trade, and local conditions. Very often he has a wide circle of friends and business connections. Unfortunately now and then, such an agent may carry too many lines, making it impossible for him to devote sufficient time to each individual commodity. Logically, he features goods offering least sales resistance and highest commissions.

The second and probably the most convenient and least expensive way to export is to establish connections with domestic export houses. Most of these firms have branch offices in large cities the world over, and are well equipped for intensive sales activities. Some of these firms specialize in paper and paper goods. To sell to them does not differ from selling the home market, except that special instructions will be furnished as to packaging, packing and marking.

Goods must be made and shipped to sample. Only quality and strict adherence to specifications can build up a lasting foreign business. Just as in domestic business, only repeat orders count. The customer must be given what he wants. To assume that anything not good enough for home consumption will be all right for the foreign buyer is wrong and leads only to grief and disappointments.

"Dumping" of commodities in foreign markets as was done in years past, injures irreparably the individual offender. It also hurts the entire trade and the prestige of the respective country of origin.

▶▶▶ The adoption of a postwar program or plan will aid the pulp and paper manufacturer in meeting the coming problems of the transitory period. Production lines have to be rebuilt for peace, and there will be many new products, new methods and new markets.

If a mill organization does not plan ahead, it surely will lose out in the postwar race for markets.

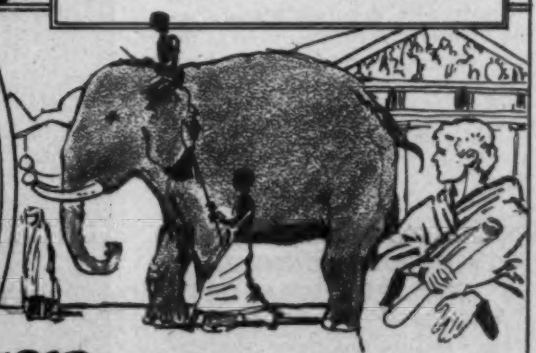
PAPER SKETCHES

BEFORE 1801, OUT-OF-WORK JOURNEYMEN PAPERMAKERS OF ENGLAND TRAMPED THE COUNTRY-SIDE, STOPPING AT EACH MILL WHERE THEY WOULD LAY ASIDE THEIR COATS, COUCH OR LAY A POST—THEN COLLECT FROM EACH VAT CREW ONE PENNY AS PAY. EVEN THE VAT FOREMAN CONTRIBUTED HIS SHARE.

ENGLISH BUTCHERS OF THE 1700'S SUPPLIED NECKS, EARS, FEET AND TRIPE OF BUTCHERED FOUR-LEGGED ANIMALS (OTHER THAN HOGS) TO PAPER-MILLS FOR THE MAKING OF SIZE. TANNERS AND LEATHER WORKERS SOLD SCRAPS OF LEATHER FOR THE SAME PURPOSE.

$0

ESSENTIAL ARE PAPER AND PAPER PRODUCTS TO THE UNITED STATES IN ITS PROSECUTION OF WORLD WAR II, THAT MORE THAN $8,500,000 WERE SPENT FOR THEM IN A RECENT THREE-MONTH PERIOD BY THE JERSEY CITY QUARTERMASTER DEPOT. THESE PRODUCTS, PURCHASED FOR THE ARMY ALONE, INCLUDED WRITING PAPER, MAPS, CORRUGATED BOXES, BOX LINERS, GREASEPROOF PAPERS, AND WATERPROOF PAPERS.



PIECES OF ELEPHANTS' TUSKS WERE USED BY THE ANCIENT ROMANS TO SMOOTH DOWN SURFACE INEQUALITIES IN PAPYRUS.

ALLIED

H. K. PORTER CO. OPENS ENLARGED N. Y. OFFICE

Designed to serve as an eastern distribution center for its entire line of locomotives, process equipment and pumps, H. K. Porter Company, Inc., Pittsburgh, Pennsylvania, announces

Thomas MacLachlan

the opening of its enlarged New York and export office at 50 Church Street, New York City. Thomas MacLachlan, former New York manager of Vulcan Iron Works, Wilkes Barre, Pennsylvania, has been named general manager.

R. G. Newell, who managed the New York office of Quimby Pump Company prior to its acquisition by Porter, is directing activities of Porter's Quimby Pump Division in New England and the New York district from the new office. Earl M. Bardo, formerly with Robinson Manufacturing Company, is headquartered in the same office, representing Porter chemical process equipment for the same territory.

The company's export department also has been housed at the new location.

◆

CLARK TRUCTRACTOR USES QUESTIONNAIRE FOR POSTWAR DATA

The Clark Tructractor Division, Battle Creek, Michigan, has developed a plan for postwar study of materials handling that is both workable and unique. Using the theory that planned materials handling is an essential element of planned production, this company is making a thorough analysis of moving materials, beginning with their raw state clear through to delivery of the finished products.

In order to gather data on the movement and storage of materials, Clark Tructractor has sent a most unusual questionnaire to executives in every industry in which materials handing is a problem. When filled out by the individual executive, the questionnaire becomes a complete data sheet for that company's particular materials handling requirements. The data acquired through this study forum will be a guide to the company in designing materials handling equipment that will meet the specific postwar needs of the various industries.

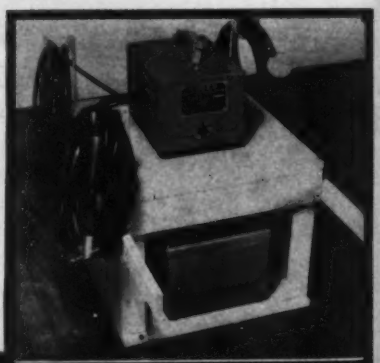
◆

▸▸▸ TWENTY-FIVE YEARS of service to many of its original clients is the record of The McCarty Company, advertising counsellors, Los Angeles, California. The organization was founded in 1919 by T. T. McCarty, company president. It has enjoyed a consistent, steady growth, and is well known as one of the oldest and largest industrial advertising agencies west of Chicago. Branches are maintained in San Francisco and Pittsburgh. As a part of its service to clients, the company has built up one of the outstanding source libraries dealing with the leading industries of the country.

◆

Patch-Welder for Paper Machine Wires

RIGHT—Close-up of portable welding unit, made by The W. S. Tyler Company, Cleveland, Ohio, for use in repairing paper machine wires . . . BELOW—Operator putting on an edge crack patch.



▸▸▸ EMPLOYEES OF General Electric Company, Schenectady, New York, numbering 2,400, who entered the armed services since Pearl Harbor and have been honorably discharged from active duty, once again are working for the company. Records show that 39,236 employees still are in service, and that 156 have lost their lives or are reported missing in action.

◆

RYERSON ACQUIRES WAREHOUSE PLANT OF BETHLEHEM STEEL CO.

Purchase of the Pittsburgh steel warehouse plant from Bethlehem Steel Company has been announced by Joseph T. Ryerson and Son, Inc., Chicago.

The property, which is located in Carnegie, adjacent to Pittsburgh, consists of a large modern warehouse building containing 150,000 square feet, and extends over an industrial site of several acres. Included in the purchase is the Bethlehem stock of bars, shapes, plates and sheets. The Ryerson company plans to augment both stock and plant facilities as soon as conditions permit, thus making available the same line of steel products as are provided by the other ten Ryerson plants.

HOW LONG Should a Dryer Felt Last?

Because a Dryer Felt's cost is only a small fraction of the total cost of drying paper—many progressive mills today are saving money, not by "stretching the life" of old felts, but by replacing them as soon as their drying efficiency begins to fall off. One plant reports a material saving in steam cost alone, when they removed an old felt with glazed-over and clogged weave preventing free elimination of moisture.

The new Felt used was the HOOPERWOOD Style 218 —an extra-porous, light-weight Cotton Felt with smooth surface for fine finish and with the same working strength as heavy felts.

The lower first cost of this felt means they don't have to stretch its life beyond its efficient usefulness to get their money back, while its better moisture elimination pays them dividends in steam economy every day it runs.

If your present dryer felts are costing too much per ton of production, we will be glad to discuss the problem with you and help you choose the particular HOOPERWOOD Felt to best meet your operating conditions.

WM. E. HOOPER & SONS COMPANY

PHILADELPHIA PENNSYLVANIA

Since 1800

HOOPERWOOD DRYER FELTS

The new plant is well situated for distribution in the Pittsburgh area and throughout the surrounding territories. It will be under the jurisdiction of W. W. Kopf of Ryerson's Philadelphia plant.

Due to limited office facilities at the plant, Ryerson has opened an auxiliary sales office in the Grant Building, 330 Grant Street, Pittsburgh 19, which will be in charge of Howard L. Robinson of the Ryerson Cleveland organization.

◆

TEN FIGHTING GENERALS

The Kellogg and American Brakeblok Divisions of American Brake Shoe Company, New York City, has distributed as the third of a series, a timely little book "Your Son and Ten Fighting Generals."

The ten generals to whom are entrusted the lives of American soldiers in the war theatres—the ten supreme Army battle commanders are:

George C. Marshall, Army Chief of Staff at the time of this writing.

Douglas MacArthur, commanding in the Southwest Pacific Theatre.

Dwight D. Eisenhower, Commander-in-Chief of all Allied Forces—land, air and sea forces in the Mediterranean Theatre.

Mark W. Clark, commanding Eisenhower's Fifth Army.

George W. Patton, Jr., commanding Eisenhower's Seventh Army.

Jacob L. Devers, commanding in our European Theatre.

Simon B. Buckner, commanding in the Alaskan Theatre.

Robert C. Richardson, Jr., commanding in the Hawaiian Theatre.

Joseph W. Stilwell, commanding our forces in China.

Lifelike portraits of the ten generals are reproduced—each on a page, outlined against a tint background. The text of the book is composed of a brief biographical sketch of each of the ten men. There is also a colorful and informative story telling how these generals were chosen. This timely subject is exceptionally well written and graphically presented.

◆

E. D. JONES AND SONS HAVE SUSPENDED FOUNDRY OPERATIONS

On February 1, foundry operations at the plant of E. D. Jones and Sons Company, Pittsfield, Massachusetts, were suspended.

Heavy war commitments, with their imperative space demands, and discontinuance of the manufacture of grey iron castings, were two of the main reasons advanced for the suspension of this program, which has been a vital part of the company's activities for upwards of 80 years. Contracts soon will be awarded for renovating the old foundry structure.

◆

HAUSER-STANDER MARKS ITS 75TH ANNIVERSARY

Marking the 75th anniversary of its founding, The Hauser-Stander Tank Company, Cincinnati, Ohio, has sent out an especially fine souvenir booklet, which is a work of art both typographically and editorially.

The history and growth of the company, its policies and accomplishments are taken up in sequence, each page carrying an appropriate color sketch. The center spread of the booklet is devoted to a photographic reproduction of the company's products. A particularly attractive cover of heavy ivory stock is embossed with a diamond.

◆

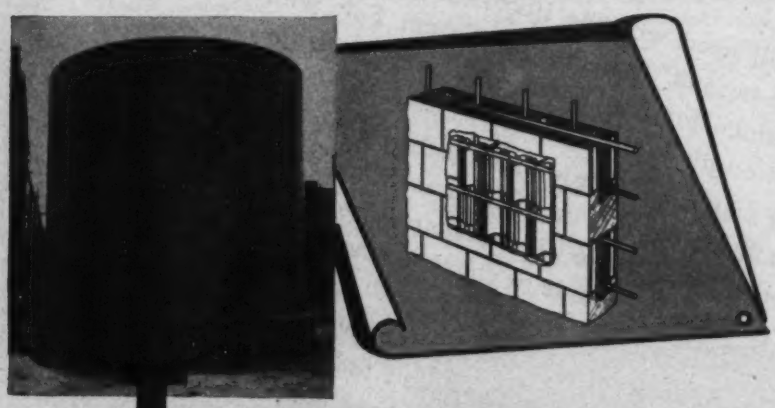
U. S. RUBBER MAKES A CONNECTION WITH SOUTH AMERICAN MFR.

Through an investment in capital stock, United States Rubber Company has become associated with Compania Croydon del Pacifico, S. A., leading rubber manufacturer of Colombia, South America, according to a statement released by L. C. Boos, vice president of United States Rubber Export Company, Limited.

The Colombian company, which is located at Cali, Colombia, and uses the Pacific Coast seaport of Benaventura, will continue to manufacture its own line of products under its own name. In addition, the Croydon Company will eventually produce and distribute in Colombia, certain U. S. Rubber lines and will draw on the technical knowledge and skill of the American company for development and improvement of rubber products for the markets of Colombia.

◆

▶▶▶ A NEW PRODUCTION UNIT, designed to manufacture products in which rubber and textiles are employed, soon will be established in DuBois, Pennsylvania, by The B. F. Goodrich Company, according to a recent announcement by T. G. Graham, company vice president. A. J. Baker, manager of Akron factory employment, has been named plant manager for DuBois. The company also has made public its decision to build a new tire manufacturing plant in Miami, Oklahoma.



TILE TANKS

... That can be constructed with a minimum of critical materials and installed without delay.

Stebbins tile tanks are erected from Semtile blocks, which are hollow salt glazed tile, cored in two directions so as to permit the use of both horizontal and vertical reinforcing. When laid in a wall and reinforced, the cores are solidly filled with concrete so that the resulting structure is in reality a reinforced concrete wall, faced on both sides with Stebbins glazed tile.

This type of construction has long life, keeps products free from contamination, flushes clean quickly and requires a minimum of maintenance.

For peace of mind call in Stebbins—the organization that for sixty years has devoted itself exclusively to lining and tank problems.

Stebbins Engineering and Manufacturing Company
EASTERN BOULEVARD, WATERTOWN, NEW YORK

Yes, it happens in the best regulated plants!

IT SEEMS AS HOW THE PRESSURE GETS CLEAR UP TO 40 LBS., BILL - SO THE BOSS IS USING HEAVY PIPE TO BE SAFE!
TNT
EXPLOSIVES
DANGER
NO SMOKING
SAFETY FIRST

THE inconsistency pointed out here isn't as rare as you might think. It occurs whenever pipe heavier than needed is used for low or moderate pressure services like those listed below. We have simply exercised a little cartoon license to bring this fact out into the light of day.

Of course the heavy pipe isn't actually used for safety. It is used simply because of the time-honored tendency to think of Standard Thickness pipe as the low point on the scale of available pipe thicknesses.

Actually Standard Thickness Pipe is fairly high on that scale. In hundreds of applications light, but remarkably strong Taylor Spiral Pipe can handle the greater part of services which are too often thoughtlessly assigned to heavier pipe.

Taylor Spiral Pipe can handle these jobs adequately and with strength and service life to spare. In many cases the installed cost of Taylor Spiral is no more than *half* that of the heavy pipe it replaces. So plants that use Taylor Spiral for these low and moderate pressure applications have saved many thousands of dollars.

Moreover, in today's emergency of wartime scarcity, the conservation of steel effected by Taylor Spiral threatens to outrank even its big saving of dollars!

Changing to Taylor Spiral Pipe for services like those listed is made easy by the complete range of sizes and fittings. Thicknesses range from 18 to 6 gauge; sizes from 4" to 42"; joint lengths up to 40 ft. All types of end joints and couplings, all kinds of fittings and specials or fabricated assemblies, are produced by Taylor Forge, assuring a complete service and undivided responsibility.

TAYLOR FORGE & PIPE WORKS

General Offices & Works: Chicago, P. O. Box 485 ★ New York Office: 50 Church St. ★ Philadelphia Office: Broad Street Station Bldg.

CHANGE TO TAYLOR SPIRAL PIPE FOR:

- High and Low Pressure Water Lines
- Low Pressure Steam and Air Lines
- Steam and Diesel Exhaust Lines
- Vacuum and Suction Lines
- Blower Piping
- Sand and Gravel Lines
- Industrial Gas Lines
- Oil and Gas Gathering Lines
- Swing Pipe
- Spray Pond Piping
- Hydraulic Mining
- Dredge Lines

ASSOCIATIONS

MICHIGAN SUPTS. AND KALAMAZOO TAPPI HOLD ANNUAL JOINT MEETING

▶▶▶ About 320 members and guests gathered for the ninth annual joint meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association and the Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry which was held the evening of January 13 at the Park-American Hotel in Kalamazoo.

A get-together in the lobby of the hotel before the dinner was described by Dwight L. Stocker, president of the Michigan Paper Company, Plainwell, Michigan, and toastmaster of the evening, as "old home week."

When dinner had been served, Glenn Sutton, superintendent of Sutherland Paper Company, and chairman of the Superintendents' arrangement committee, introduced the toastmaster, Dwight Stocker, who presented the national heads of both the associations: S. G. Blankinship, of the Port Royal Sales Company, New York, president of the Superintendents Association; and Ralph A. Hayward, president of Kalamazoo Vegetable Parchment Company, national president of TAPPI.

Both men spoke briefly. Mr. Blankinship praised the work of the Michigan Division, especially in the field of improving labor relations. Mr. Hayward commented similarly for his organization, with the added warning that this is not going to be an easy year for the paper mills He pointed out that improvement in labor relations is one of the most important jobs before the industry, and he charged management especially with the task of continually improving the situation.

Mr. Stocker then presented the men at the speakers table, during which ceremony R. L. Eminger, Miamisburg, Ohio, national secretary of the Superintendents Association, was given a rousing welcome.

Among those at the speakers table were: George H. Gerpheide, president of the Hawthorne Paper Company; Arthur Bermingham, Chicago, of Bermingham and Prosser Company; L. W. Sutherland, chairman of the board of the Sutherland Paper Company and mayor of Kalamazoo; E. T. A. Coughlin, Bryant Paper Company, and past president of the Superintendents Association; Frank Hamilton, Allied Paper Mills, and chairman of the TAPPI arrangements committee; Raymond L. Barton, Michigan Paper Company, and national first vice president of the Superintendents Association; Joseph L. Waber, Rex Paper Company; Brinton Freman, Sutherland Paper Company; Maxwell D. Bardeen, president of the Lee Paper Company; Ralph Atkins, also of the Lee Paper Company; Walter Wolfe, MacSimBar Paper Company; Allan B. Milham, president of the Bryant Paper Company; A. B. Perlick, Kalamazoo Vegetable Parchment Company; Frederick D. Elliott, Michigan Research Laboratories, and E. B. Taylor, American Cyanamid and Chemical Corporation.

Mr. Stocker, a member of the Pulp and Paper Allocation Committee of WPB, gave a summary of the group's work. He pointed out that beginning nearly two years ago the group was concerned, for the first twelve months, with equalizing inventories. This was necessary because the pinch in pulp found some mills short and others overstocked. Regardless of seeming inequalities, this work was a war measure and had to be done. This condition, according to Mr. Stocker, is particularly acute in the Kalamazoo Valley because of this area's dependence on pulp and bleached kraft supplies. The first quarter of 1944 will be the worst, he predicted, with improved collection of waste paper somewhat easing the situation. However, steps are being taken to have 6,000 men released to work in the northwestern pulp area. Secretary of State Hull likewise is being urged to press the Canadian Government to ease the embargo on hemlock logs shipments—with some prospect of success, Mr. Stocker implied. He then introduced the guest speaker of the evening, Dr. James E. McCarthy, dean of the College of Commerce of Notre Dame University, South Bend, Indiana, who spoke on "The Objectives of Free Enterprise."

The ninth annual meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association and the Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry at the Park-American Hotel in Kalamazoo, Michigan, brought together this group. Seated (left to right) are: S. G. Blankinship, national president of the Superintendents Association; Ralph A. Hayward, national president of TAPPI; Dr. James E. McCarthy, dean of the School of Commerce, Notre Dame University, who was guest speaker; and Glen Sutton, chairman of the Michigan Division of the Superintendents Association. Standing (L to R) are: Frank Hamilton, chairman, Kalamazoo Valley Section of TAPPI; Robert L. Eminger, national secretary-treasurer of the Superintendents Association; Ray Barton, national first vice president of the Superintendents Association and Dwight L. Stocker, who was a toastmaster.

Following are highlights from Dr. McCarthy's address:

Primary in the American way of life is a belief that the American brand of freedom, by inheritance and right, is our most precious heritage. Freedom suggests personal and political liberty, which causes alien and false leaders to be challenged when they attempt to impress a spurious brand upon us. Loud and clamorous groups are inherent in any political system, contending that the evolutionary forms of freedom are outmoded. These seeds of discontent are sown, and new and

The source of finer paper-making chemicals . . . since the year nineteen hundred . . . . . .

PAPERMAKERS CHEMICAL DEPARTMENT

HERCULES POWDER COMPANY

INCORPORATED

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Boston, Mass. Holyoke, Mass. Albany, N. Y. New York, N. Y. Atlanta, Ga. Savannah, Ga.
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Portland, Ore. San Francisco, Calif. Freeman, Ont. (Hercules Powder Co., Canada, Ltd.)

SUPERIOR PMC CHEMICALS

PI-40

glamorous schemes for achievement of the millenium are proposed.

Dr. McCarthy declared that he is not convinced that our industrial system, the right to own privately, the right to earn a reasonable profit are in themselves evil and destined to destroy all of us. He cited industrial enterprises, admitted industrial mistakes, and then listed corrective measures proposed by dreamers, reformers, escapists, advocates of stateism and collectivism, malcontents, liberalists.

This group seeks government operation of certain essential industries and their production control, taxes to take the profit motive from business, national paternalism, suspension of capital and managerial rights through laws of an impractical nature, substitution of state dictation for private initiative and profit limitation. By contrast, the objectives of free enterprise are to provide workers with decent wages, good working conditions, relatively short hours, good homes, education facilities, vacations, good communities in which to live, and most imperatively, protection against an improvident old age.

Dr. McCarthy stated, "I think there is a dawning realization among us that what has occurred in the nation during the past ten years does not augur well for the preservation of those American interests that up to recently have been our guarantees of greatness and/or approximate self-sufficiency.

◆

CHICAGO PROFESSIONAL GROUP ELECTS OFFICERS

At the second regular meeting of the Chicago Professional Paper Group, held January 10, 1944, at the Medinah Club, Chicago, the following officers were elected:

President—Harold R. Alley of Tested Papers of America, Inc.

Vice President—A. E. Montgomery of J. O. Ross Engineering Corp.

Secretary—V. V. Vallandigham of the Kelco Company.

Treasurer—Arnold McAneny of Bradner, Smith & Co.

In accepting the presidency of the group, Mr. Alley spoke briefly of its origin and goals. He mentioned that a letter was written during April, 1943, to R. G. Macdonald, Secretary of TAPPI, in which the need for a technical paper group in Chicago was suggested. This letter, Mr. Alley said, prompted an informal discussion of the matter during the Army and Navy Requirements Conference sponsored by TAPPI and held last September at the Palmer House in Chicago. Mr. Alley added that about a dozen paper and related industries technologists met on the evening of November 1, 1943, to decide on the creation of a Chicago Paper and Related Industries Technical Group. The favorable decision prompted announcements of the first regular meeting going out to almost 400 individuals affiliated with the printing, food, conversion, meat packing, container and other industries as well as local war agencies. Approximately 100 persons attended this first meeting which was held December 6, 1943. Mr. Alley states that present arrangements call for meetings the first Monday of each month from September to June, inclusive.

As to the goals of the group, Mr. Alley mentioned that they are two-fold: (1) to serve Chicago area men in technical, operating, sales, and executive positions interested in paper and paperboard, its manufacture, conversion, printing, and uses; and (2) at the proper time, to request affiliation with TAPPI.

The feature of the second meeting was a school on papermaking. Following the opening exercises which covered the election of officers and general announcements, two motion picture films were shown by Robert Grandstaff of the *Chicago Tribune*. The first of these films was entitled "Trees to Tribunes" and in brief it revealed through superb photography, a spoken narrative, and an orchestral accompaniment how pulpwood is gathered, how newsprint paper is made and how the *Chicago Tribune* is produced. It proved a very colorful presentation and was followed by one equally as colorful on "Trees for Tomorrow" furnished by American Forest Products Industries. This film presented the dramatic story in sound of the contribution of our forests to the war effort and emphasized the need for conservation of this natural resource to take care of future needs. Modern methods of fire prevention, careful harvesting of the mature forest crop through selective logging and replacement of the crop through planned forest conservation were illustrated by the film. The showing of these two films completed the first period, and that was followed by a Questions and Answers period where the faculty (contrary to usual academic procedure), answered questions raised by the group rather than ask them as would be the case ordinarily. The faculty, with Harry E. Weston of THE PAPER INDUSTRY AND PAPER WORLD as principal, included Major James d'A Clark, U. S. A., Subsistence Laboratory, Quartermaster Corps; Dr. R. A. Diehm, technical director, Container Corporation of America; John F. Halladay, technical director, American Coating Mills, Inc.; W. K. Kidder, Office of Price Administration; and Capt. Raymond J. Schadt, U. S. A., Chemical Warfare Service.

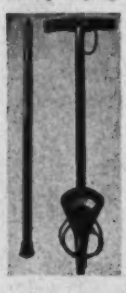
Harold R. Alley

The questions put to this group were very pertinent and covered a wide range of subject material. The spontaneity of the group in asking questions was ample evidence of the success of the meeting at which more than 150 persons were present.

CHECK ROLL TEMPERATURES

EASILY . . . ACCURATELY

Faulty drying roll temperatures that cause many headaches in papermaking can be located quickly and easily with a Cambridge Surface Pyrometer. Use of this portable instrument for periodic checking of roll surfaces permits increased protection with complete safety . . . lower steam cost . . . less broke . . . better paper.



CAMBRIDGE INSTRUMENT CO., INC.
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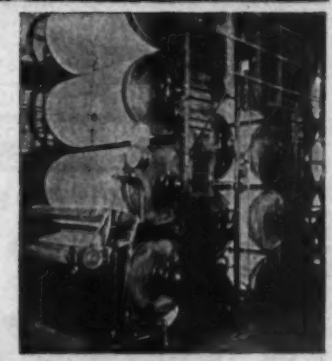
CAMBRIDGE
SURFACE PYROMETERS

UNDER PRESSURE



Vertical Dryer

A six-year job in seven months. That's highway engineering with a vengeance—and it shows what men can do under pressure. There are also times when paper mills and their suppliers must join forces to accomplish the seemingly impossible.

The first vertical dryer grew out of pressing necessity—greater drying capacity was needed at once and no direction to go but up. The first breaker beater was the child of desperate need—hand sorting and batch pulping was too slow. The hydrapulper is a more recent "big time" development—another "seven league stride" in the evolution of pulping.

Thus all three divisions of the Black-Clawson Company have, like the Alcan builders, come through in the pinch. In like manner they will continue to do so in the future for their engineering talent is there for that very purpose.

Post war engineering now being planned. Can we, at this time, be of service to you?

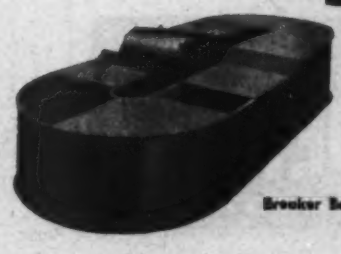
Dilts Hydrapulper

THE BLACK-CLAWSON CO., HAMILTON, OHIO

DIVISIONS:

SHARTLE BROS., MIDDLETOWN, OHIO
DILTS MACHINE WORKS, FULTON, N. Y.

SHARTLE Dilts



Breaker Beater

S A F E T Y

NSC ANNOUNCES NEW MEMBERSHIP SERVICE FOR SMALL PLANTS

The National Safety Council, Chicago, has announced a new membership service designed exclusively to fit the needs of industrial organizations with 100 employees or less.

In announcing the new service, Ned H. Dearborn, executive vice president of the Council, stated that the accident problem in these smaller organizations long has been a real one—more serious than some owners realize, because they haven't analyzed their accidents from the standpoint of costs and other factors.

A recent survey of hundreds of industrial organizations in this size group, covering seven different industries, showed that the average accident frequency rate for these organizations actually was 47 per cent higher than the average for the largest organizations in the same industries. Furthermore, in those industries studied, the average frequncy rate for the small organizations was higher in every case than the average for the entire industry.

This study is conclusive proof that accidents occur too frequently in the so-called small plant and that they disrupt production, cut down efficiency, boost insurance costs, damage worker-morale, waste material, and ruin tools and machinery.

The small-unit memberships will include the following services:

1) A safety manual on what management should know about organization and operation of an industrial safety program, including a wealth of detailed, technical information, as well as general suggestions. The manual will be revised annually.

2) Supplies of accident prevention charts and safety inspection check lists to permit keeping books on the problem.

3) Monthly poster service with selections made especially for small unit operations.

4) Master copy of a "letter to employees" on a timely safety subject, the letter to be reproduced, signed and distributed in the way the member feels is most effective.

5) Monthly issue of a safety instruction poster, the subject selected from the Council's library of more than 500 such subjects.

6) A full year's subscription to *National Safety News*, official magazine for Council members, which will contain, starting with the February issue, a section devoted exclusively to the problems of this type of member.

7) A monthly "accident oddities" sheet, containing bulletin board subjects on safety interpreted with a touch of humor and informality.

8) In community council localities the member will, in effect, get two memberships in one—in his community safety council, as well as a special membership in the national organization.

In localities where they exist, the new memberships will be accepted exclusively through the community safety councils. In areas not served by community councils, inquiries should be directed to the National Safety Council, 20 N. Wacker Drive, Chicago 6, Illinois.

GRUENDLER CRAFTSMANSHIP
Employed by U.S.A. in the WAR EFFORT

For a Better Refined PULP

GRUENDLER "TURBO" REFINER

Actually Separates, Hydrates, and Combs Fibres—No disintegration and shortening of Fibres with this new method

Let us send you our Laboratory Reports and Bulletin

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SAFETY COUNCIL WILL LAUNCH THREE NEW RESEARCH PROJECTS

Three new research projects, to cost upwards of $50,000, recently were announced by the National Safety Council.

The research work, to begin soon, will be under the auspices of the Council's ASSE-Industrial Section on the following subjects:

1) Safe walkway surfaces.
2) Plastic eye protection.
3) Safety belts, harness and accessories.

The projects have been outlined to determine all factors pertinent to safety in the design, use and maintenance of materials and products in each of the three fields.

The safe walkway surface project will be the most elaborate and will take a major part of the money to be expended. The work will be financed by money appropriated to the Council by interested industries.

The very best research facilities will be used, including, where needed, the laboratories and experts of an outstanding university.

SAFETY SCORES

▶▶▶ IN THE ANNUAL Paper Industry Safety Contest which began July 1, 1943, reports received for December show thirteen mills maintaining a perfect record. These mills are:

Division I—Pulp and Paper Mills

Group A—(None)

Group B—
St. Croix Paper Co., Woodland, Me.

Group C—
Strathmore Paper Co. (Woronoco Mills), West Springfield, Mass.

Group D—
American Writing Paper Corp., Holyoke, Mass.
Marathon Paper Mills Co., Rothschild, Wis.
Spaulding Fibre Co., Inc., North Rochester, N. H.
*Central Fibre Products Co., Vincennes, Ind.
International Paper Co., Riley, Me.

Division II—Paper and Board Remanufacturing

The Flintkote Co., Rutherford, N. J.
Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.
Kimberly-Clark Corp. (Atlas Mill), Appleton, Wis.
Bird & Son, Inc., Shreveport, La.
South West Box Co., Sand Springs, Okla.
Bay West Paper Co., Green Bay, Wis.
*Report Missing.

The paper industry safety contest is conducted among member mills of the Paper and Pulp Section of the National Safety Council, and runs for twelve months. The present contest covers the period July 1, 1943, to June 30, 1944.

The SPELLING has been changed

...but the PROCESS remains the same!

The original spelling of the word *felt* was *filt*. The process of separating the suspended solids from any fluid by passing it through a filt was therefore called *filtering*. Though other porous substances are sometimes employed as filters, no satisfactory substitute can be found for fine woolen felt as the medium for separating the fibers from the water in manufacturing papers and boards.

Because Hamilton Felts remove more water in less time they permit faster operation of the paper machines. They also require less steam at the drier rolls. This means more tonnage at less cost.

And because they are uniformly woven and perfectly finished, Hamilton Felts leave no felt marks and no damp areas in the sheet. This means paper of better formation and less broke.

From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Miami Woolen Mills

Hamilton Felts

Established 1858

NAMES *in the* NEWS

Personals

TIMKEN ANNOUNCES NEW APPOINTMENTS

The Timken Roller Bearing Company, Canton, Ohio, elected John E. Fick vice president in charge of the Steel and Tube Division, at its recent annual meeting. Mr. Fick, general superintendent of this Division since 1937, was elected to the directorate of the company in 1940. He joined Timken in 1921 immediately following graduation from Ohio State University.

Incoming general superintendent of the Steel and Tube Division is E. S. Hoopes, Jr., who has been associated with the company since 1932.

A newly created office, director of metallurgy, will be held by Walter G. Hildorf, former metallurgical engineer for the company. Nationally known as a metallurgist, Mr. Hildorf has written and lectured extensively on many related subjects. From 1917 to 1920 he was instructor and associate professor in the metallurgical department of Michigan State College, and joined the Timken organization in 1928 after 20 years' experience in his field.

Ralph L. Wilson fills the position left vacant by Mr. Hildorf's promotion.

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▶▶▶ *Walter E. Murray* was elected a vice president of Warwick Chemical Company, West Warwick, Rhode Island, at its recent annual meeting. Mr. Murray has served with the company for two years, first as sales manager and later as manager of the Textile Chemical Department. He is a graduate of Providence College and at one time was affiliated with Lonsdale Company and Pacific Mills.

◆

▶▶▶ *Fred A. Conkle* is incoming manager of the Distributor Sales Department for both the J. B. Ford and Michigan Alkali Divisions of Wyandotte Chemicals Corporation, Wyandotte, Michigan. Since 1940, Mr. Conkle has served successively as sales manager and general manager of the William Lynn Chemical Company, Inc. (Indianapolis), distributors for Wyandotte Chemicals.

Fred A. Conkle

◆

▶▶▶ After twenty-five years of responsibility for the editorial and business administration of *Nation's Business,* its editor and publisher, *Merle Thorpe,* has resigned. In accepting his resignation, the board of directors of the Chamber of Commerce of the United States appointed him a member of the magazine's Governing Board. He will be succeeded as editor by *Lawrence F. Hurley,* who for several years has been assistant editor.

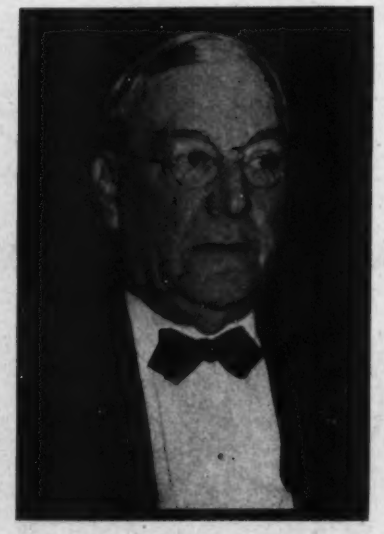
◆

PERSONNEL CHANGES AT PENNSYLVANIA SALT

Pennsylvania Salt Manufacturing Company, Philadelphia, announces the following changes in personnel:

North Emory Bartlett retires from the vice presidency. Mr. Bartlett, whose association with the company dates back to 1894, came to the Philadelphia office some 30 years ago. He was made general sales manager in 1925 and vice president in charge of sales in 1928. He is a member of the Technical Association of the Pulp and Paper Industry.

L. H. Brandt, chemical engineer, recently has affiliated with the Technical Service Department. Mr. Brandt formerly was with E. I. du Pont de Nemours and Company.



North Emory Bartlett

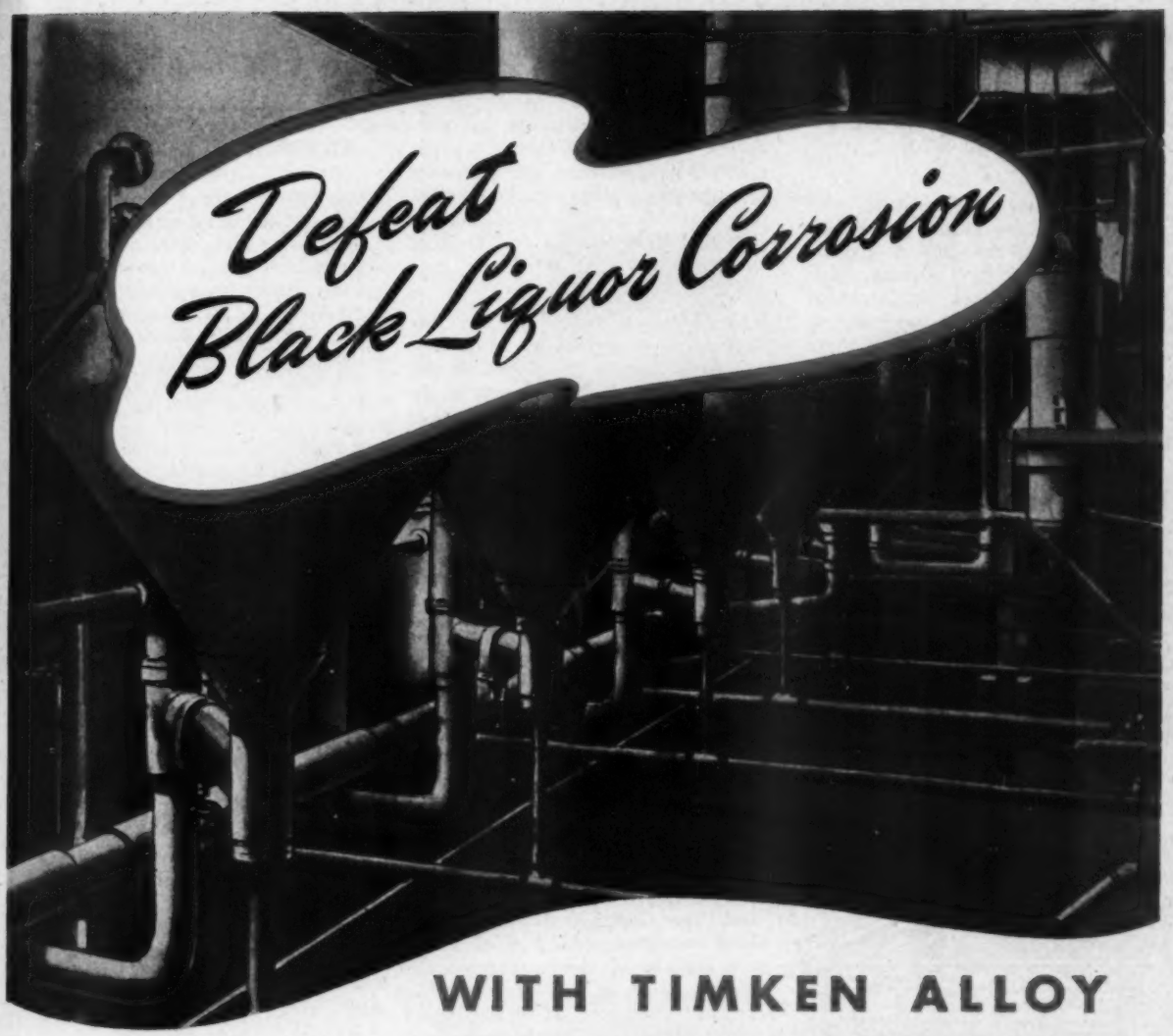
L. H. Brandt

SEVERAL CHANGES AT WESTINGHOUSE

Changes in personnel in Westinghouse Electric and Manufacturing Company, East Pittsburgh, have been announced as follows:

Leon R. Ludwig, former head of the Circuit Breaker and Protective Devices Division, has been named manager of the Motor Division. Mr. Ludwig collaborated with Dr. Joseph Slepian, associate director of the company's research laboratories, in the development of the *Ignitron,* a power tube which converts alternating current into direct current. He succeeds R. W. Owens, resigned.

William J. Massey now is general lamp sales manager of the Lamp Division. Mr. Massey, who will head-



WITH TIMKEN ALLOY STEEL EVAPORATOR TUBES

CORROSION caused by black liquor is a serious problem. It is responsible for expensive replacements and down time, with a consequent loss of production and profits.

Many leading mill operators have found that the most economical way to defeat corrosion is to install Timken Alloy Steel Evaporator Tubes in their black liquor evaporators. Extensive tests, conducted over a period of years, prove that seamless tubes made of Timken Alloy Steels give uniformly better results.

Timken Seamless Tubes can be had in a wide range of analyses. No matter how exacting your individual requirements may be, you are sure to find a Timken Analysis ready to meet them.

Timken metallurgists have made a special study of the conditions of creep and corrosion at normal and elevated temperatures. As a result they are prepared to solve many of the knotty problems mill operators have to face.

A request on your firm's letterhead will bring you the Specifications of Timken Alloy Steel Tubes For Black Liquor Evaporators. Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

SEAMLESS STEEL TUBES

quarter in Bloomfield, N. J., is to have charge of all lamp sales activities of this Division, including district sales offices; and the illuminating engineering, commercial engineering and advertising departments.

◆

▶▶▶ Supervisor of industrial relations for the Manufacture and Repair Department, Westinghouse Electric and Manufacturing Company, East Pittsburgh, is the new title accorded *Lee W. Ralston,* former supervisor of trade and industrial teacher training for the California State Department of Education.

◆

NEW DIRECTOR OF EMPLOYEE SERVICES AT FARREL-B. CO.

Director of employee services for Farrel-Birmingham Company, Inc., Ansonia, Connecticut, is the new title of Albert W. Hendrickson who, prior to his new appointment, was director of industrial relations for Kellett Aircraft Corporation of Philadelphia. Mr. Hendrickson's new duties place him in charge of employment, first aid, training programs, employee magazine, cafeterias, and other personnel activities throughout the company's three plants at Ansonia and Derby (Connecticut) and Buffalo (New York).

A graduate of the University of Pennsylvania and a former faculty member, Mr. Hendrickson has conducted classes in engineering, science, production supervision and personnel management, and directed courses for the War Manpower Commission in job instruction training for Training Within Industry groups.

◆

▶▶▶ Incoming sales manager for Central Paper Company, Muskegon, Michigan, is *John L. Boynton,* who fills the position left vacant by the passing of W. A. Wrase. Coincidental with his appointment, the company announces the location of its general sales offices in Muskegon and the retention of the Chicago office as a branch sales department. Mr. Boynton formerly was with the New York office of Brown Company.

◆

▶▶▶ Incoming manager of the Cincinnati office of Wyandotte Chemicals Corporation (Michigan Alkali Division) is *G. T. Robinson,* who for several years has been central regional supervisor for the J. B. Ford Division, Cleveland. He replaces C. D. Morris, now serving with the U. S. Merchant Marine.

◆

▶▶▶ The following promotions in the personnel of the Bathurst Power and Paper Company, Montreal, P. Q., have been announced: *J. G. Chalmers,* mill manager, is now manager of operations, *J. A. Hanna* succeeding him as mill manager. *H. A. F. Gregory,* general superintendent, has been made superintendent of production in the pulp and paper mill. *W. C. Baggs* is promoted from mechanical superintendent to chief engineer.

◆

▶▶▶ Vice president of the Montmorency Paper Company, New York (an affiliate of the Anglo-American Pulp and Paper Company), and at one time a partner in the firm of Clark, Campbell and Moore, *Leon W. Campbell* passed away at his home in New York on January 12 at the age of 56. He is survived by his widow, a son and a daughter.

◆

▶▶▶ The appointment of *George L. Bayer* as vice president and chief engineer for Roofing Machinery Manufacturing Company, Chicago, has been announced by the company. Prior to 1941, Mr. Bayer was production engineer of the United States Gypsum Company for five years, and has had considerable experience in the designing of rag, felt, pulp and paper mills.

Necrology

ARTHUR C. ZIMMERMAN

Arthur Charles Zimmerman, retired vice president and general manager of the Pacific Paperboard Company, Longview, Washington, passed away December 27 at the age of 47.

Mr. Zimmerman, who has had wide experience in the paper industry, was born in Neenah, Wisconsin. At one time he was associated with the Mac Sim Bar Paper Company, the Boldt Paper Company and the E. T. Fleming Paper Company, but joined the Pacific organization in 1929, remaining with them until his retirement last year.

He is survived by his widow and two sons.

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▶▶▶ A well known figure in pulp and paper industry circles, *George N. Ostrander,* vice president of Finch, Pruyn and Company, Inc., Glens Falls, New York, passed away at Saratoga Springs on January 19.

His widow and one son survive.

◆

HAROLD W. KNIGHT

Sales executive of Bulkley-Dunton Pulp Company, New York, and an affiliate of the company for 21 years, Harold W. Knight passed away in Greenwich, Connecticut, on January 15.

Mr. Knight was at one time superintendent of Louis de Jonge, Staten Island, and later was made mill manager for the King Paper Company, Kalamazoo, Michigan.

He is survived by his widow, a daughter, and a son, Ensign Donald G. Knight, who is on duty in the Pacific.

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▶▶▶ *George N. Carleton,* former vice president of Detroit Sulphite Pulp and Paper Company, Detroit, was elected to the presidency at a recent meeting of the board of directors. Mr. Carleton succeeds the late Harold R. Telfer, who passed away the latter part of December, 1943.

◆

THOMAS T. WALLER

Chairman of the board and former president of H. G. Craig and Company, New York City, Thomas T. Waller recently passed away at his home after an illness of five months. He was 81 years of age.

At one time, Mr. Waller was owner of the Globe Paper Mill. Later, he was made manager of one of International Paper Company's mills, even-

tually rising to the position of manager and vice president of the firm. He became a partner of the Craig firm in 1911.

He leaves a widow and two daughters.

◆

▶▶▶ *Richard Jennings,* field engineer, and an associate of Oliver United Filters, Inc., New York, since 1927, passed away in Lawrence, Massachusetts, on January 23. His widow and two children survive.

◆

WM. LEWIS EDMONDS

A colorful career dating far back to the days of Wisconsin's paper industry was brought to a close with the passing in Wausau on January 21, of William Lewis Edmonds, one of the organizers of the Wausau Paper Mills, Brokaw, and its general manager from 1889 to 1935.

Mr. Edmonds was born in Buchanan, Michigan, in 1862, a son of the Rev. Lewis Miles Edmonds and Mary Esther Thorpe Edmonds, the former having served as a pastor in Michigan for many years.

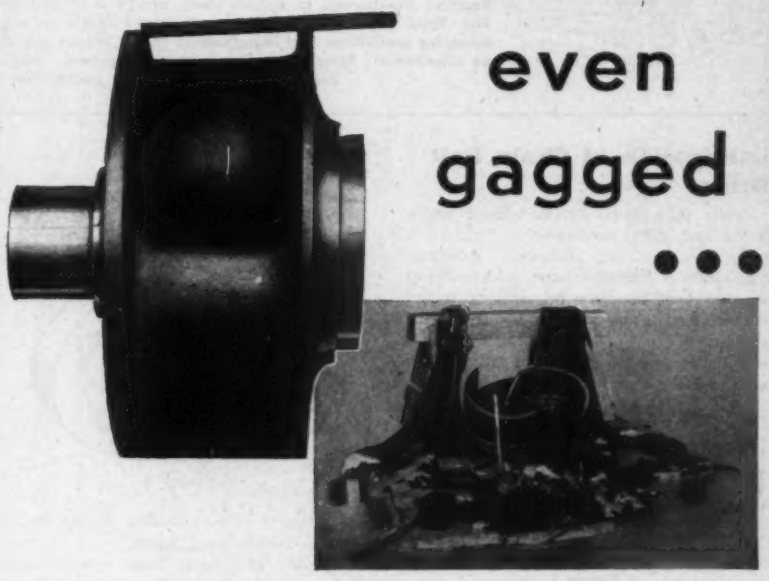
Young Mr. Edmonds left Michigan for Marinette, Wisconsin, to associate with his brother-in-law, the late Norman H. Brokaw, at that time prominent in the Marinette-Menominee Paper Company. Later, Mr. Edmonds was made manager of the Falls Manufacturing Company at Oconto Falls, and in 1889 he went to Brokaw to assist in the organization of the Wausau Paper Mills, the first project of its kind in the Wisconsin River Valley. Interested in this project were two brothers, Fred J. Edmonds (now in Evanston, Illinois), Edward Ames Edmonds (now in San Diego), and Norman H. Brokaw, who for many years had been prominent in the Wisconsin and Michigan paper mill industry, and for whom the town of Brokaw was named.

Mr. Edmonds' parents made their home in Wausau in 1908, prior to which time his father was pastor of the Brokaw Methodist church, established through funds provided by the paper mill company and Mrs. Brokaw.

In addition to his connection with the Wausau Paper Mills, Mr. Edmonds was president of the D. J. Murray Manufacturing Company from 1921 to 1930, and continued thereafter as a director of the company. He was presented with a life membership in the Superintendents Association during a meeting held by the Northwest Division about a year ago.

Mr. Edmonds is survived by three sons, one of whom, Lieut. Hobart Edmonds, now is in the U. S. Merchant Marine; and two daughters.

Never even gagged ● ● ●



You've heard those wonderful stories about the sizes of objects that can be swallowed by some varieties of fishes and snakes. Here are two bonafide photographs of Morris Centrifugal Pump impellers with objects that have passed through them.

One is the enclosed impeller of a 10-in. pump through which an 8-inch wooden (not rubber) ball has just passed. The other is an open impeller that has handled wooden blocks, trash and clothing without clogging or damage.

There's little cause for worry about operating interruptions in a Morris Non-clogging Pump—whether used for sewage, paper stock, or any other kind of pulp.

ST-P Non-clogging Pump — Guaranteed Non-binding for Pulpy Mixtures

Double Suction Horizontally Split Pump for Clear Liquids

MORRIS MACHINE WORKS Baldwinsville, N. Y.

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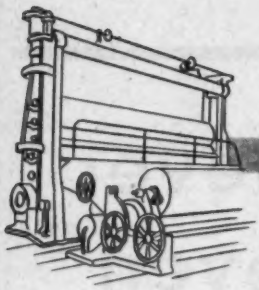
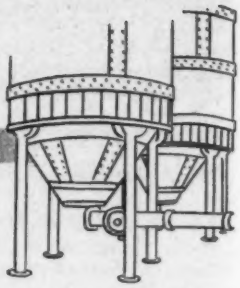
CENTRIFUGAL PUMPS



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Lubrication of Chain Belt Drives

Many slow speed drives operate under dusty and dirty conditions. And, as a rule, they are not enclosed. Adequate lubrication is difficult—heavy oil applied to the outside of the chain belt seldom reaches the working parts and only catches dirt and grit.

For best results, periodical cleaning by removing the chain and washing it in kero-

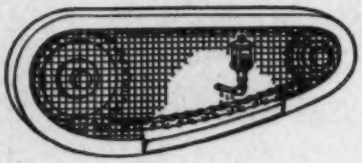


Figure 1

sene or gasoline is recommended. Cleaning periods will depend on the severity of the service.

After cleaning, soak the chain in a light oil to restore the lubricating film.

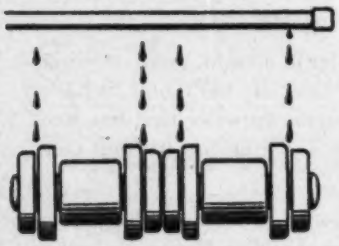


Figure 2

Remove excess oil by hanging the chains up to drain. Be sure sprockets are clean before reinstalling chain.

For drives running at medium speeds, continuous lubrication is a "must." Drives operating under dusty or dirty conditions should be completely enclosed.

In clean locations, a channel surrounding the drive is sufficient.

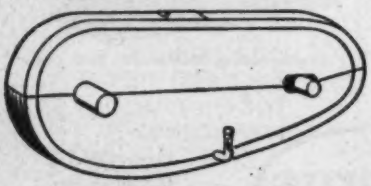


Figure 3

Drip sight feed oilers have proved adequate for lubricating medium drives (Figures 1 and 2).

The drops of oil should be directed to the inside of the chain between the side plates as it is entering the drive sprocket. In this way, the oil will work into the pins and bushings. Observation will easily determine the correct amount of lubrication. Do not allow oil to build up in the case,

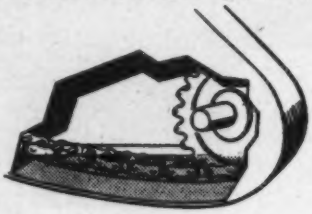


Figure 4

but drain it off periodically. Often the oil may be safely used again.

Chains operating at high speeds should be completely enclosed in an oil-tight case (Figures 3 and 4).

It is important that the proper oil level be maintained. The lower strand of the chain should just dip into the oil when chain is running.

Excess oil will cause churning and heating. Every few months, check the quality of the oil and if dirty, flush the case and replace dirty oil with fresh.

Chains running at extremely high speeds require special equipment for proper lubrication. The standard oil tight case and oil bath lubrication is not satisfactory as the oil becomes turbulent and never reaches the working parts of the chain.

Proper lubrication of extremely high speed drives requires a force feed circulating pump system (Figure 5). The pump keeps the oil circulating and discharging continuously to the inside of the chain

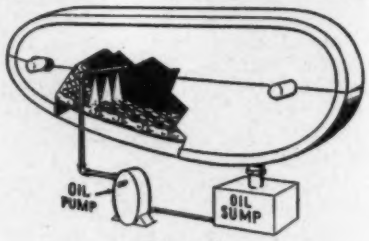


Figure 5

so that it is thrown outward through the chain. Often an external oil cooler is required if the drive is operating in a very warm location in order to keep the oil moderately cool. Bulletin No. 435, CHAIN BELT COMPANY.

26 Simple Safety Rules

1. Insist that operators wear proper clothing and omit rings.
2. Sell foremen on the safety idea.
3. Let each employee know that management approves safety practices.
4. Inaugurate an educational program to secure employees' co-operation, especially new employees.
5. Impress on every employee the value of safety.
6. Do not allow operators to oil machinery in motion.
7. Discourage unnecessary conversation and "visiting" while operating.
8. Insist on the use of the safety equipment provided.
9. See that foremen's instructions are followed.
10. Impress on workmen the necessity for excercising prudence.
11. See that floors are kept in good condition.
12. Be sure that necessary guards are installed.
13. Be sure that first aid is rendered, even for minor accidents.
14. Insist on good housekeeping.
15. Watch for proper loading of skids—be sure they are not overloaded.
16. Look out for any defective machinery.
17. Do not allow the use of mushroomed tools.
18. Do not allow belts to be shifted by hand while machines are in motion.
19. See that hands are kept out of dies during setup.
20. See that proper extensions are installed on punch presses.
21. Do not allow gauges to be measured or set while machine is in motion.
22. See that hand tools are inspected and repaired regularly.
23. Have cables, hoisting, and lifting equipment inspected periodically.
24. Teach respect for employer's property.
25. Give proper instructions on how to lift.
26. See that safety instructions are followed up.—A. F. ERICKSON, *Factory Management and Maintenance.*

◆

Don't Neglect Little Grievances

Sometimes when a worker brings up a petty grievance, the supervisor feels that he is "too busy" to spend time on such a small matter. When so many big and important things are demanding every minute of your time, it is quite nautral that your first reaction should be to sidestep these petty grievances.

There are, however, six very good reasons why you should take time to handle the little grievances of workers. Before you

do any sidestepping, think these reasons over carefully:

1—Little grievances tend to grow. If you handle grievances correctly when they are little, they won't have an opportunity to grow big.

2—As the direct supervisor of your workers, you should have first chance at handling situations that upset them.

3—Being right on the scene, you can handle such grievances more promptly than anyone else.

4—You know your men better than anyone else in the organization does.

5—You want to grow and develop in your ability to handle human relations problems. Practice is the best teacher.

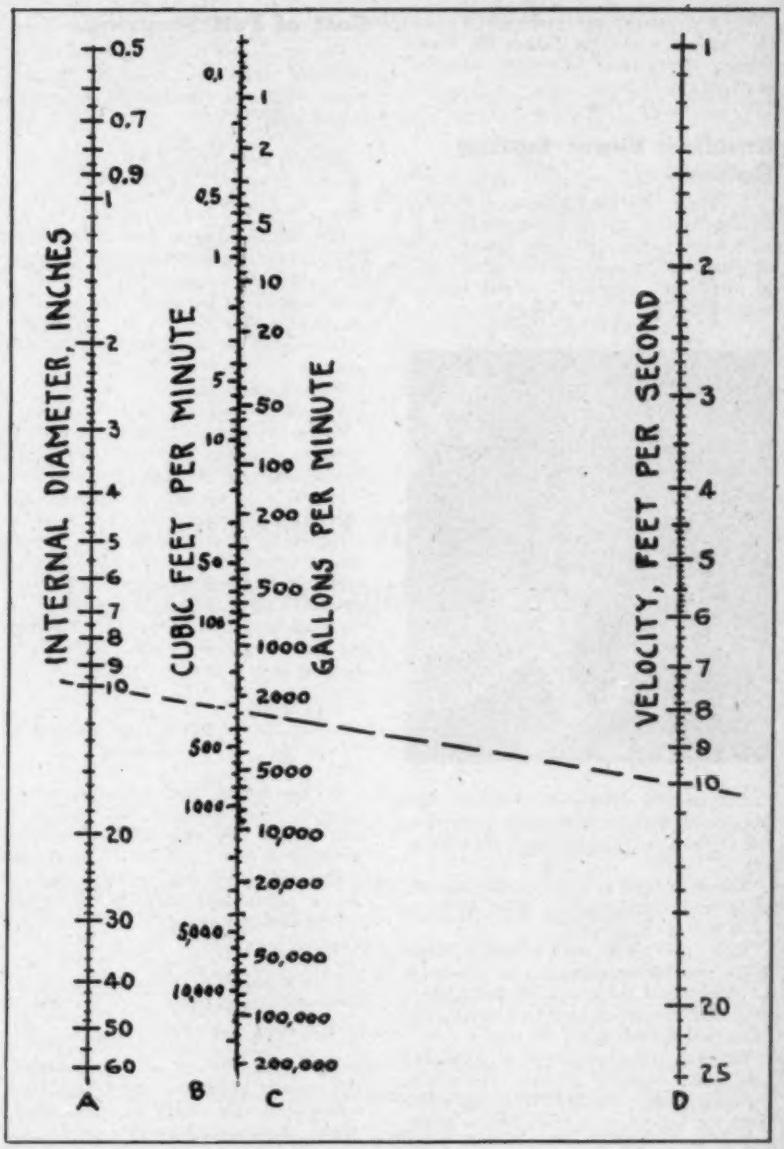
6—If you don't handle these petty grievances, they may eventually have to be handled by someone else. If the workers have to go to someone else, and thus "by-pass" you, the respect and confidence that your workers have for you will be weakened, and your prestige will suffer badly.—*Management Information*, ELLIOTT SERVICE CO., INC.

◆

Water Flow Chart →

The accompanying chart includes the ordinary pipe diameters from 0.5 inch to 60 inches (Column A), and water velocities from one to 25 feet per second (Column D). Problems most commonly met are solved by simply running a straight line across and through the two known points in columns A and D.

For example: The dotted line drawn across the chart shows that if the internal diameter of the pipe is 10 inches (Column A), and the velocity of the water is 10 feet per second (Column D), then the flow of water through the pipe amounts to nearly 2,500 gallons per minute (Column C) or its equivalent of nearly 325 cubic feet per minute (Column B.)—W. F. SCHAPHORST, M. E.



◆

Automatic Stop for Couch Roll

Why have builders of paper machines failed to provide a means for stopping a couch when the wire is skidding off a fourdrinier? The wire guide is supposed to keep a wire from running off; but it doesn't always do it. Would much ingenuity be required to make an automatic stop for a couch roll? Such a device not only would make the machine tender's job easier, but it also would prevent many wires from being destroyed.—ARCHIE MCCAFFERY.

◆

Helpful Hints for Handling Packings

1. The better the condition of the equipment, the longer the packings will last.

2. Keep bearings in alignment. Packing is for sealing and cannot take the place of bearings.

3. Use packings of correct size. Oversize packings are difficult to install and may cause excessive friction. Undersize packings may be ruined by too much takeup.

4. Don't be afraid to let packing leak a small amount. It is good assurance that packing is not too tight and the liquid usually has some lubricating qualities.

5. Where leakage cannot be permitted, provide a means of introducing a sealing or lubricating fluid such as water, oil or grease into the stuffing box.

6. When renewing packing, use all new, clean packing. Worn packings are dry, highly compressed, have high friction and may develop scoring.

7. Remember packing is relatively cheap. Labor and materials necessary to replace worn shafts, sleeves or rods are expensive and critical commodities.

8. Think of every stuffing box as brake assembly that must develop the minimum frictional resistance. Pressure times velocity in feet per minute, times co-efficient of friction, is a measure of the energy absorbed by a stuffing box.

9. Line up flanged packing surfaces. No gasketing material is compressible enough to compensate for flanges out of parallel.

10. Use expansion joints to take care of expansion and contraction strains. No gasketing material is elastic enough to follow the flanges during these cycles.

11. Take up bolts evenly, moving to the bolt diametrically opposite, never to the bolt adjacent.

12. Follow up bolts the next day after installing new gaskets. For lines carrying high pressures, the gradual building up of the pressure and continuous follow-up of bolts is recommended.

13. Exercise great care when using gasketing dopes. Never use oil or grease on a rubber or rubber compounded gasket. Graphite and glycerine or molasses compounds are not injurious to rubber. Never use dope on both sides of gasket—it may cause slippage or blowout.

14. Do not use a heavier sheet packing than is necessary. The thinner the gasketing material, the better.

15. Ring gaskets are preferable to full face gaskets where the flanges are heavy enough to prevent distortion.—JOHNS-MANVILLE.

◆

Grinding Paper Cutting Knives

A dull knife always increases the draw. Indications that the knife is getting dull are a wider impression on the cutting stick, or when the cut edges of the paper tend to stick together like a pad and become burnished.

The frequency with which knives must be ground depends upon quality and temper of steel, and type of paper stock being cut.

Knives in hard use, day in and day out, often require resharpening, after 48 hours of actual cutting time.

Only the users can determine when knives need resharpening, for the condition of the knife is the first thing to inspect—after making sure of correct clamping pressure—when work is not cut true.

In some cases a solution of emulsified oil, soap and water is used. Generally, however, plain water is all that is used to keep the knife from burning on the grinding wheel.

The grinding wheel is set in a tub of water which is carried around the wheel and applied to the bevel of the knife by the wheel.

If the grinding wheel is too small in diameter, the concave of the bevel will be too great and the blade of the knife will break more easily.

The knife is bolted to a movable grinding table or platform which is turned over until the bevel of the knife is facing the grinding wheel. The wheel is then moved up to the bevel of the knife, adjusted so that it touches the entire width of the bevel.

Some grinders can detect hollow spots by the variations in the tone of the grinding wheel as it moves over the knife. Chalk marks also tell where the wheel is passing over the bevel.

Always, when grinding knives, the wheel should be allowed to run beyond the ends of the knife for some distance before it returns, giving the bevel time to cool.—"Paper Cutting," HENRY DISSTON & SONS, INC.

Cost of Felt Scouring

The actual cost of felt scouring can be calculated from the following formula which takes into consideration the several factors involved:

$$\frac{M + (T \times F)}{D \times P} = C$$

M—cost of materials for scouring

T—machine time involved (for washing on machine or changing felt)

F—conversion factor or cost per hour of machine time

D—number of days felt is run after scouring

P—production per day

C—cost per ton of scouring operation

As an example of the false economy of using poor quality material, consider the hypothetical case of scouring similar felts

In one case the felt is scoured using materials that amount to two dollars and a run of five days is made when it must again be scoured. The machine time involved in scouring is one hour. The conversion factor is fifty dollars per hour and the daily production 100 tons. Substituting in the above formula, the cost of scouring is as follows:

$$\frac{2 + (1 \times 50)}{5 \times 100} = \$0.104 \text{ cost per ton of scouring}$$

In the second case, a similar felt is scoured using materials that amount to four dollars. By using better quality materials, it is found possible to run the felt 6 days before scouring again or an extra day is gained over the previous method. All other factors would remain the same. Then:

$$\frac{4 + (1 \times 50)}{6 \times 100} = \$0.09 \text{ cost per ton of scouring}$$

Examining the cost of felt scouring in this manner brings out the fallacy of attempting to save money by using inferior grades of scouring materials. In the particular example given, a saving of one cent per ton is made by simply giving the felt a better scouring and extending its run for a day. In most actual cases, if the efficiency of the scouring were doubled it would amount to a run of more than a single day. In other words, the important factor to consider is the tonnage produced between scourings rather than simply the chemical cost of the scouring operation.—L. E. ROSSITER AND WALTER B. MOREHOUSE, THE PAPER INDUSTRY AND PAPER WORLD.

◆

Remedial Measures for Accidental Inhalations of Chlorine

Inhalations of small amounts of chlorine gas will not permanently injure health. The effects are temporary and merely disagreeable. In case of accidental inhalation of the gas the following remedial measures may be taken:

(a) Get out of the gas atmosphere as soon as possible but avoid chilling. Resist coughing as much as possible.

(b) A teaspoonful of either essence of peppermint, Bromo Seltzer or a few drops of ammonia mixed with a glassful of water will relieve coughing.

(c) For continued coughing, a treatment with an oxygen inhalation apparatus is very beneficial. A forty-minute treatment will usually remove all ill effects.

(d) Call a physician in case of doubt.—DIAMOND ALKALI COMPANY.

◆

Effect of Hot Bearings on Calender Rolls

When a bearing in a calender stack generates an abnormal amount of heat, the heat flows into the end of the roll, causing expansion at that end. Unless the roll has sufficient crown to compensate for the expansion, adjacent rolls will ride on the ends, leaving the center open and making a reel of paper soft on the ends and hard in the center.

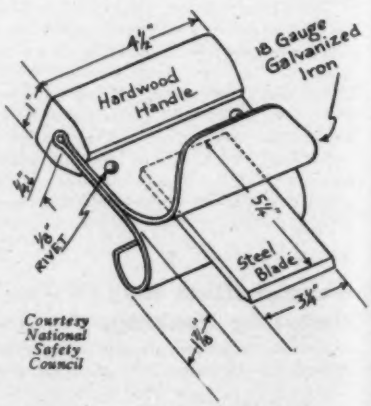
This condition should not be compensated for by increasing the crown of the roll, unless it is possible to reduce the amount of heat generated by the bearing. Checking the bearing for wear, misalignment and improper or insufficient lubrication, will usually bring the real cause of the trouble to light. In the case of water-cooled bearings, an ample flow of water running freely through the cooling chamber is necessary for maximum cooling effect. *Booklet No. 114,* FARREL-BIRMINGHAM COMPANY, INC.

◆

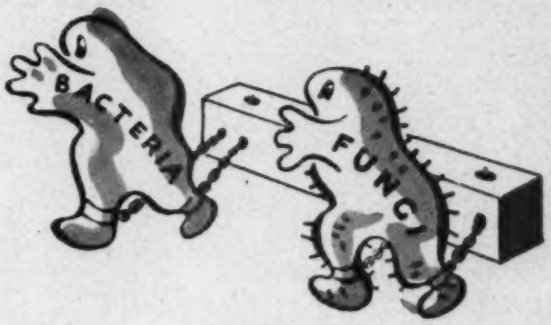
Roll Scraper

When it is necessary to scrape accumulations of material off power-driven rolls, there is always the danger that the scraper may catch in the nip of the rolls and pull the hand and arm in with it.

This danger may be overcome by supplying home-made safety scrapers. These



are made in two pieces, a handle and a blade. If the blade is caught, it pulls out of the handle and passes through the rolls. The handle is curved to guard the hands and this shape also prevents it being pulled into the rolls.—*Safety Instruction Card No. 34,* NATIONAL SAFETY COUNCIL.



...Stops Damage by Fungi and Bacteria
...Helps Solve Paper Shortage

EVERY step to increase production is a move toward solving America's paper shortage. And Santobrite, Monsanto's highly effective fungicide and bactericide, helps keep paper mills humming by making troublesome microorganisms inactive.

The use of Santobrite controls slime, fungi and bacteria which cause slime spots, breaks, blinded wires, plugged felts, dirty stock, clogged water lines, rotted felts, and which create many other obstacles to good mill operation.

The use of 0.1 to 1 pound of Santobrite per ton of pulp or paper produced, usually gives protection. The amount needed will depend upon the extent to which your whitewater system is closed, the quality of your water supply and the characteristics of your stock. The cost of Santobrite treatment ranges from 1½ to 18 cents per ton of pulp or paper produced. No expensive equipment is needed for the application of Santobrite, which is available either as powder or briquettes.

Santobrite is chemically stable, non-corrosive to metals, non-volatile, practically odorless and, when handled properly, its use is no hazard to health of mill workers nor those who use the mill's products.

Limited amounts of Santobrite are available on priority for continuous anti-slime treatment.

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Newsprint Paper in 1943*

ROYAL S. KELLOGG

▶▶▶ ECONOMISTS ESTIMATE that during 1943 something like two-thirds of the industrial output of North America consisted of war materials and supplies. This, of course, brought about many well known and much-publicized difficulties in the way of getting man-power, equipment and raw materials for civilian goods. There were also governmental restrictions upon the making of less essential articles.

Under these circumstances it is somewhat surprising and really remarkable to cast up the account and find that the North American output of paper and paperboard in 1943 was at least as great as in 1942. In the case of United Statets it is figured that some 16,800,000 tons of paper and paperboard were turned out by the mills last year or nearly 400,000 tons more than in the preceding year. This more than overbalanced the decreases in output in Canada and Newfoundland.

To a great extent this unexpectedly large production in the United States was accounted for by the increase in paperboard output, the total of which was nearly equal to the combined tonnage of all other paper grades. Much paperboard, of course—and also a considerable quantity of other kinds of paper—went directly into war uses. Hence, the enforced reduction in civilian consumption.

While there was some reduction in newsprint production and consumption, both were larger than seemed likely at the beginning of 1943. Production was helped through the use of reserve supplies of wood, and consumption through the corresponding use of paper stocks. A large increase in demand by advertisers for space, together with the surpassing of all previous circulation records, brought great pressure for more newsprint.

SUPPLY

Production

North American production of news print in 1943 rounded up to 4,024,000 tons. This was a decrease of 8.7 per cent from the output in 1942 or 383,000 tons.

Last year's production was the least in any year since 1938 when the output was 3,713,000 tons. However, as has been mentioned at various times previously, the 1938 output was as abnormally low as the 1937 tonnage was abnormally high, so the only sound comparison is with the average of 4,328,000 tons for those years On this basis the 1943 continental production of newsprint was the least in any year since the 4,021,000 tons made in 1935.

The 1943 output of North American newsprint was supplied to the extent of 74 per cent by Canadian mills, 20 per cent by United States mills and 6 per cent by Newfoundland. The decrease in Canada from the preceding year was 6.1 per cent, that in the United States 15.5 per cent, and in Newfoundland 14.9 per cent.

Canadian production in 1943 was maintained at a relatively better rate than that in the United States or Newfoundland. To get a smaller figure than the 2,983,000 tons of newsprint made in Canada in 1943, we need only to go back to 1939 when the output was 2,869,000 tons.

To get a smaller figure than the 805,000 tons made in the United Statets last year, we have to go back over 40 years. Similarly, to get a figure comparable with the 236,000 tons made in Newfoundland, we must go back to 1928.

The 4,024,000 tons of newsprint turned out in North America in 1943 was equivalent to 68.5 per cent of an assumed capacity of 5,872,000 tons. The closest operating approach to assumed capacity that the North American mills as a whole have reached in recent years was in 1937 when the output was 4,944,000 tons, or about 87 per cent of theoretical capacity.

Shipments were 53,000 tons more than production during 1943, leaving mill stocks of 116,000 tons on December 31, compared with 168,000 tons twelve months earlier. This brought mill stocks down to the lowest point since December 1937.

Exports

Official figures from Ottawa are to the effect that exports of newsprint from Canada in grand total amounted to 2,810,000 tons last year compared with 3,005,000, or a decrease of 6½ per cent from 1942.

Canadian overseas shipments in 1943 were only about half of the average in the years just preceding the war, but they were nevertheless larger than in 1932.

Exports of standard newsprint from the United States in 1943 were reported by the mills to have been nearly 15,000 tons compared with 18,000 tons in 1942. If at some future time Washington policy again permits the release of official figures, such figures will undoubtedly be larger than those above given. This will be because Washington export statistics include under the heading of "Newsprint" a number of closely related grades which do not come within the standard definition.

OUTLOOK

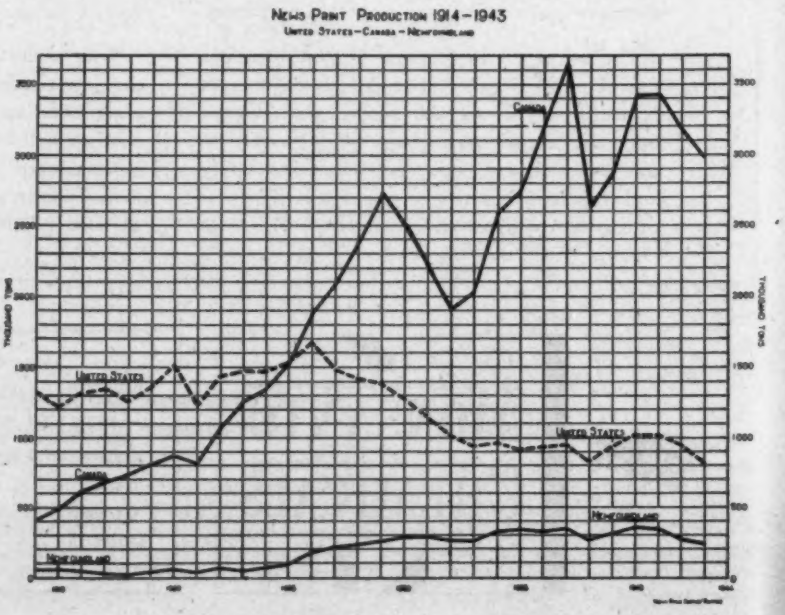
The latest WPB statement in Washington anticipates a total of 1,638,000 tons of newsprint available for all purposes in the United States during the first half of 1944, but so far it has not promised that the use of this entire amount will be permitted. The WPB talks about restoring inventories voluntarily reduced by some newspapers below the permitted maximum in the latter part of 1943, and also proposes a reserve to meet appeals for extra tonnage.

If the 819,000 tons per quarter available for 1944 usage in the first half of the year were continued throughout the twelve months with no change in publishers' stocks, the total consumption in the United States in 1944 would be 3,276,000 tons—a decrease of about 10 per cent from the 1943 consumption.

Speculations of this kind however, may be somewhat vain and entirely upset by the course of the war. There is considerable support in high quarters for a belief that the war with Germany may terminate by the middle of 1944. This would considerably ease the manpower situation notwithstanding the job still to be done in the Pacific. Strenuous efforts and much publicity in the United States and Canada have produced a greater amount of pulpwood than appeared probable in the middle of 1943. These efforts are being maintained and should yield further results. Publishers' stocks might also be further drawn upon. An optimist might be tempted to say, therefore, that a figure of 3,276,000 tons of newsprint consumption in the United States in 1944 is a minimum rather than a maximum guess. But optimists are often unsafe guides.

Notwithstanding the small increases allowed by the OPA, the price of newsprint is now further below the general commodity price level than ever before.

(*) Abridged from report released by the author, who is secretary of the News Print Service Bureau.



Produce Clean Wood *with* MURRAY WOOD CLEANING EQUIPMENT—

With the present pulpwood situation you have no choice except to try and produce as clean wood as possible. Murray wood cleaning equipment can help you now, as it has been helping paper mills for over half a century.

The Murray Knot drill shown here is just one of the machines developed to keep pace with the changes in the industry. It is especially designed for top working speed to reduce wood cleaning costs and yet increase production of a cleaner better sheet of paper.

SOME OTHER EQUIPMENT

Barking drums
Pulpwood slashers
Knot saws
Wood cleaners (Vertical head, double or single head cleaners)
Short log saw mills
Chip crushers
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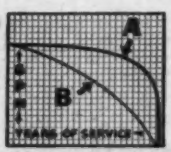
A PAPER MILL PUMP *That is* Self-Adjusting for Wear

BLACKMER ROTARY "Bucket Design"



A—Blackmer pump capacity. Note the long sustained efficiency. B—Conventional Rotary Pump capacity.

ECONOMY YOU NEVER EXPECTED

For handling size, starch, black liquor soap, caustic, asphalt, wax, paste and similar material.

Wear is confined to the tips of the buckets, which automatically compensate for wear.

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5 to 750 GPM—Pressures to 300 psi.
All standard drives.

HAND PUMPS

7 to 25 GPM—54 Models.

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This much can wear away, without affecting the capacity of the pump.

Write for Bulletin No. 304—"Facts about Rotary Pumps."

BLACKMER PUMP COMPANY
2130 Century Ave.
Grand Rapids 9, Michigan

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Pulpwood—the Paper Industry's No. 1 Problem*

The Statistical Background

Wood pulp, which is produced from pulpwood, constitutes the principal source of fibrous material for the paper and paperboard industry. As shown in Figure 1, the consumption of pulpwood per average ton of paper and paperboard produced has not varied greatly over the past four years. As a rough and ready rule-of-thumb measure, the factor of one cord of pulpwood consumed per average ton of paper and paperboard produced can be used. This factor varies somewhat depending on waste paper utilization, depletion of wood pulp inventories, and diversion of wood pulp from paper uses to non-paper uses such as rayon, nitration, and export. However, some of these factors compensate and the figure of one cord per ton can be used for an approximate appraisal of the situation.

In Figure 2, United States pulpwood receipts, consumption and inventories are shown for the years 1941, 1942 and 1943.

Receipts of pulpwood in 1943 were approximately 2,400,000 cords or 11.4 per cent below the level of 1942. Consumption exceeded receipts by 700,000 cords, with the result that inventories were heavily reduced.

It must be borne in mind that except in the south, where pulpwood receipts and consumption are more or less on a current basis, there is a considerable time lag between the cutting of pulpwood and its receipt at the pulp mill. For instance, the bulk of the pulpwood received by mills in 1943 was cut in 1942, and the bulk of the wood that will be received in 1944 will have been cut in 1943. This is due largely to the seasonal nature of pulpwood operations. There will be some wood cut in the early winter and summer of 1944, which will be delivered during the same year; however, by and large, a considerable time lag exists for the bulk of the wood cut.

Thus the question is not one of how current receipts compare with the receipts during comparable periods of a year ago but rather of how the wood cut during the cutting season of 1943, which will be delivered during 1944, compares with the wood cut during the season of 1942, which was delivered in 1943.

The American Paper and Pulp Association has recently compiled data received from a large cross section of pulpwood consumers relating to this question. According to this data, twenty-two companies in the Northeast reported that the quan-

(*) Released by E. W. Tinker, executive secretary, American Paper and Pulp Association, New York, N. Y.

Fig. 1—United States Paper and Paperboard Production Related to Pulpwood Consumption 1940-1943.

Year	Paper Produced Tons	Pulpwood Consumed Cords	Tons of Paper and Paperboard Produced Per Cord Pulpwood Consumed
1940	14,483,709	14,430,106	1.00
1941	17,304,143	16,259,000	1.06
1942	16,522,000	16,845,000	.98
1943 (est.)	16,700,000	15,000,000	1.11

Fig. 2—United States Pulpwood Receipts, Consumption, Inventories, all species 1941-1943

Total United States (Rough Cords of 128 cubic feet)

Year	Receipts	Consumption	Inventory at End of Year
1941	17,170,000	17,360,000	3,717,000
1942	16,710,000	16,845,000	3,378,000
1943 (est.)	14,300,000	15,000,000	2,678,000

The Song of the BLUE SPRUCE

Away up North where the snow drifts high,
Where the tall trees thrust their tops to the sky,
Where Jack Frost prowls and the timber wolf howls,
And the bark of foxes and the screech of owls,
Are the only sounds among the trees,
Except the swishing of the breeze,
As the wind whines by with a wounded sigh
Bearing the Spruce trees doleful cry:
"Oh, what a pitiful tragedy!
A pulpwood shortage at Mosinee.
Zounds! What a numbing catastrophe!
Imagine our incredulity!
For here we stand, all set this fall,
Awaiting only the woodsman's call.
But none have come this year, so we
Cannot be pulped into Mosinee.
Oh, what a pitiful tragedy!"

WE dedicate this
"Song of the Blue Spruce" to the
Paper Industry of our Country,
because the problem of the
"pulp wood shortage at Mosinee"
is the basic problem that
faces every paper producer of
America.

THE MILLS OF MOSINEE
Essential Papermakers

tity of wood cut during the period May to November, 1943, was below the quantity of wood cut during the same period in 1942 by percentages varying from 5 to 93 per cent. In the Lake States three companies reported cutting above the 1942 level, but twenty-two companies reported underruns varying from .8 to 80 per cent. These data are summarized in Figure 3.

Fig. 3—Pulpwood Cutting May-November, 1943, as compared with same period of 1942.

Per Cent	Number Companies reporting Northeast	Number Companies reporting Lake
1943 Under 1942		
0-10	6	3
11-20	2	2
21-30	5	4
31-40	2	2
41-50	4	6
51-60	2	2
61-70	0	1
71-80	0	1
81-90	1	0
1943 Over 1942		
1-10	0	1
21-30	0	1
41-50	0	1
160-170	0	1

Average (arithmetical) — All companies reporting included under 1942: Northeast 32 per cent; Lake States, 25 per cent.

Even though the figures given in Figure 3 are in cases estimated, they assume particular significance. Such data are not susceptible to quantitative analysis, but are indicative of trend. The average reduction in cutting for the Northeast was 32 per cent and for the Lake States 25 per cent. Assuming that remedial measures already instituted may improve the picture somewhat, it is apparently a conservative estimate that pulpwood cut during 1943 was at least 20 per cent under 1942. Consequently, it may be assumed that pulpwood receipts during 1944 would be approximately the same percentage less than during 1943. As pulpwood receipts were 14,300,000 cords in 1943, this would indicate receipts of less than 12,000,000 cords in 1944.

Assuming that another million cords of wood can be taken from inventories, the total wood supply available for consumption would apparently amount to some 13,000,000 cords. On the basis of past performances, a domestic paper and paperboard production of between 13,000,000 and 14,000,000 tons could be achieved in 1944 compared with 16,700,000 tons in 1943, 16,522,000 tons in 1942 and 17,300,000 tons in 1941.

Some of the conclusions drawn above are vulnerable in that the data are not exact and are subject to different interpretations. Other factors are variable, and actual developments may affect the situation to a large extent. As an example, a greatly increased waste paper supply would improve the situation and, conversely, increased requirements of wood pulp for nitration, rayon, and export would have the opposite effect. However, while the conclusions drawn and the figures given are conjectural to a certain extent, the situation as appraised appears to be serious enough to warrant concern and to necessitate immediate remedial measures.

American Pioneers

Alexander Graham Bell patented the telephone in 1876. Picture shows the 1879 model of which there were five thousand in U.S.A.

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Common Sense in Postwar Planning*

GEORGE S. MAY
George S. May Company

▶▶▶ INDUSTRY IS MAKING its postwar problems more complex than necessary. Postwar committees are concerned too much with the unknown and unpredictable. Such speculation leads into a maze of by-paths, dead-end streets and blank walls. Planning based on the known and proved elements of good management will lead to success at any time.

Looking at the postwar picture from the position of the average manufacturer, there are a number of vitally important things he can do now which involve few if any variable equations. They are common sense applications of tried and proven principles.

Of prime importance is cost reduction. It is axiomatic that the manufacturer who gets his house in order now will be in the best position no matter what happens. He will eliminate wasteful practices, establish scientific controls in the place of guesswork, incorporate technological improvements in products and methods.

Herein is a vast area of practical postwar planning. On every hand we see wastes of space, time, energy and materials. Finding these avenues of waste and establishing controls over them is the necessary prelude to postwar cost reduction.

Installation of adequate controls is the first step. Five major divisions of administrative controls should be considered.

(*1*) *Organization Chart.* The organization chart is a graphic diagram which clearly specifies the authority and responsibility of each management function. Thus it eliminates uncertainty, straightens out the flow of authority, gets rid of overlapping and cross purposes. It streamlines a company for crisp and direct action to attain postwar objectives.

(*2*) *Defining of Policies, Procedures, Duties.* Complete manuals should detail the specific duties of all functions and subfunctions. Procedures and policies should be set forth clearly and properly channeled. Many problems taking up the valuable time of top management become routine, completely understood and automatic in operation. This channeling and definition of duties will clarify the confused, loose thinking on postwar problems.

(*3*) *Cost Finding.* Substantial wastes remain hidden in many plants because of the absence of accurate cost finding. Lacking the basis for knowing where costs are excessive and the mechanics for keeping them under constant observation, there is no adequate means of controlling costs and fixing the blame for those which are excessive. A modern cost finding system is tremendously important at any time—the lack of it may mean business suicide in the postwar era.

(*4*) *Budgets.* Lack of adequate budget control results in "half-baked" decisions based on snap judgment and intuition. These superficial decisions are often responsible for grievous wastes. How can management hope to plan intelligently without knowing what constitutes a reasonable potential and without establishing a measure of accomplishment? Adequate budget control substitutes certainty for uncertainty.

(*5*) *With a sound system of costs and budgets,* management has the basis for effective operating reports. Foremost is the monthly summary of each department which shows actual direct labor cost compared to budget allotment. Monthly and quarterly reports contrast estimated and actual performance pertaining to production, labor, expense, plant, and equipment. These and other operating reports supply direct control over industrial wastes. They aim accurately at the main target of postwar planning—cost reduction.

With these administrative controls established, management is in a position to consider Production Control, a major industrial device which reduces waste in actual production time.

Standardization of jobs and methods is basic in establishing cost reduction. The preliminary approach analyzes and records over all arrangements, processes, equipment

(*) Condensed from statement released by Mr. May, who is head of the large firm of business engineers which bears his name.

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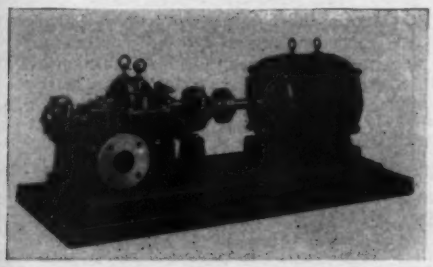

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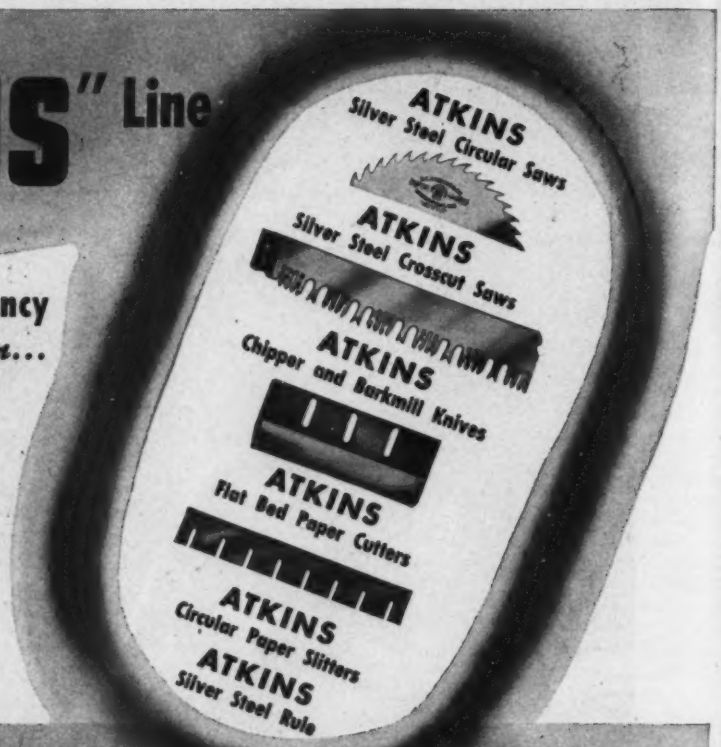

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and material handling from the viewpoint of worker efficiency. All of these elements must be co-ordinated into harmonious productivity.

When these foregoing steps have been accomplished the way is paved for an adequate wage incentive plan. More than 50 per cent of all manufacturers now use some form of wage incentives, but many of these plans are antiquated and need thorough revision.

Several other prime causes of waste and inefficiency should be scrutinized. Plant layout, for example, should be analyzed from the standpoints of reducing time and handling costs. Materials handling equipment better suited to after-the-war manufacturing may achieve substantial savings in labor cost and in smoother flow of production. Machine capacities should be thoroughly checked. Better research facilities are a major consideration for study of markets, products and technological developments. To plan soundly you must have facts, not guesses.

These are just a few of the tried and proven elements of good management. I believe that they should constitute the basis of all postwar plans.

The industrial advancement of generations has been crowded into a few years. The scientific development of machines, methods and procedures makes unlimited opportunities for the postwar world. We will have taken full advantage of these opportunities when, and only when, we have applied the realistic principles of good management to Business, Labor, and Government.

Convention Papers . . . Abridged

This section concludes abridgments of some of the papers read at the *Army and Navy Conference*, sponsored by *TAPPI*, in Chicago, September 21-24, 1943. Previous installments were published in October, November, and December, 1943, and January, 1944.

Effect of Pulp Bond Density on Engine Sizing

WILLIAM S. WILSON[1] and HAROLD E. DUSTON[2]

We concur with the idea that the most rapid path of travel of a liquid into a sheet is through the capillaries between the fibers and this work is based on the assumption that engine sizing is used primarily to reduce the capillary forces which suck liquid into the finished sheet. A liquid rises in a capillary because it is pulled up by the surface tension of the liquid film which is attached to the capillary wall. Sizing consists of attaching small rosin particles to the fibers which reduces the vertical component of the surface tension force and therefore the tendency to draw liquid into the capillaries formed by the fiber walls, because the rosin has a higher contact angle than cellulose.

(1) Research Director, Monsanto Chemical Co., Merrimac Div.; (2) Sales Development Dept., Monsanto Chemical Co., Merrimac Div.

The necessity for a firm bond between rosin and fiber has, to say the least, been underemphasized. If the pull of surface tension is greater than the force holding the rosin particle to the capillary wall, the rosin particle will be pulled off and will expose the lower contact angle cellulose to the liquid film.

Both pulp and rosin are cation exchangers capable of exchanging surface mono- or divalent cations for trivalent aluminum ions. Any given aluminum ion is not necessarily concerned solely with one rosin particle or one pulp fiber as it might easily become simultaneously involved with both types of particle, thereby binding them together.

We do not pretend to understand the mechanism of this binding. The relative sizes of aluminum ions and rosin particles makes it difficult to believe that direct aluminum bonds are the only means of binding.

Aluminum ions are subject to hydrolysis, which explains why sizing is difficult at high temperatures. The higher the pH the greater the difficulty. This same hydrolysis is probably responsible for most of the H ions found in determining the so-called pH of a paper. It is doubted if a combined Al ion or a few protons resulting from its hydrolysis will affect the durability of paper, for it is more probable that the hydrogen ions require some SO_4 ions if real destruction is to occur.

On This Screw Machine . . . .

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Here is an excellent example of how well it pays to consult the Gates Field Engineer on *any* problem of drive operation.

On the screw machine pictured above, the Macomb Screw Products Company used natural rubber V-belts, getting 6 to 8 months' wear at 12 to 18 hours per day. Because a *severe oil condition* existed, the Gates Field Engineer recommended changing to Gates V-belts of special synthetic rubber. These special synthetic belts are averaging 18 to 24 months' wear at *24* hours per day—an increase of 300% to 400% in belt life!

You may not have in your plant any drive which offers this *particular* problem—yet *other* service conditions may be such that a V-belt of some special construction can most profitably be used. For example, in your particular installation, V-belts with tension members composed of flexible steel cables may prove to be the most efficient and economical. Again, Rayon Cord V-belts or Static-Safety V-belts may best fit your special need.

In any case, the wisest move you can make is to phone the Gates Field Engineer. He is thoroughly competent to analyze any drive problem. He is completely informed on the nature and advantages of every type of belt. He will always recommend the practice that will be most efficient and economical for you.

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4. Static-Safety V-Belts
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Pulp is not a dispersed homogeneous melt. Each fiber has had its own personal life history and therefore characteristics of its own. The bond density on any given fiber is anything but uniform. There are other differences in the colloidal properties of pulp and rosin, but they are not of immediate concern.

If pulp fibers have numerous points where the bond density exceeds the bond density of the rosin particles, an opportunity is wasted if a rosin particle is merely stuck on those points. It would be more advisable to use these points for a rosin particle of high bond density and have low bond density rosin particles for the parts of the pulp fiber which have a lower bond density.

A beater puts enough energy into the furnish to knock loosely fastened rosin particles off of pulp. The more tightly fastened particles are less likely to be knocked off, so the eventual equilibrium should at least approximate the more desirable condition.

Most cation exchangers are fundamentally acidic in nature, the acid hydrogen being the ultimate active principle. This hydrogen can be exchanged for some other cation, which in turn can be exchanged for still other cations. Equilibrium is generally attained rapidly, and is solely dependent upon the activity and concentration of the ions in the system in contact with the exchanger.

There are several materials which can be inter-reacted to give a molecule having two to three times the number of active hydrogen ions existing in rosin. Presumably, the more active hydrogens there are in a molecule, the greater are the number, per unit area, on the surface of a particle built from these molecules. A poly-carboxylic resin (Mersize) is such a compound.

This poly-carboxylic resin is a solid resinous material and is supplied as a viscous alkaline water dispersion containing 50 per cent resin. (All mention of this product in this report refers to the 100 per cent resin.) The material is readily dispersed in cold water (50 to 100 Fahr.) up to concentrations of 3 per cent to form a stable dispersion suitable for addition to the beater in the same manner as rosin size. Dispersions of higher concentration may be made, but they tend to form a gel on standing. In addition to water dispersions, this new resin may also be dispersed directly in a dilute rosin size dispersion at the above temperatures. If one wishes to use 50 per cent on the weight of the rosin the upper limit of concentration appears to be about 1.5 per cent of the resin dispersed in a 3.0 per cent rosin size dispersion. Mechanical agitation such as a lighting mixer should be used to disperse the new size.

The order of addition of rosin and the poly-carboxylic resin to the stock appears to be immaterial. The amount of the new material required will vary according to the sizing desired, and the pulps being used. In general, 50 per cent on the weight of the rosin is the highest practical percentage to be used if maximum sizing or the most sizing for a limited amount of rosin is desired. If either of the above is not required then as little as 10 per cent on the weight of the rosin will appreciably extend the engine sizing range and usually result in sizing economies. There is one point that should be emphasized and that is that as the ratio of this resin to rosin is increased, maximum sizing is obtained

P. A. PAULSON, Consulting Engineer
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On the basis of accumulated experience and carefully observed tests, Nickel-Clad Steel was used for the inlet.

Strong, tough and corrosion-resistant, the Nickel-Clad offered the additional advantage of extra large plate size, which permitted the construction of an inlet with a minimum of welded joints.

Fiber and other stock components do not accumulate on the smooth Nickel-Clad Steel surface. A continuous, uniform and accurately calipered flow of Kraft stock, 17' 6" wide, moves through to the fourdrinier wire, traveling at speeds up to 1400 feet per minute.

The inlet design and the Nickel-Clad construction have proved their merits during 30 months of high-speed war production.

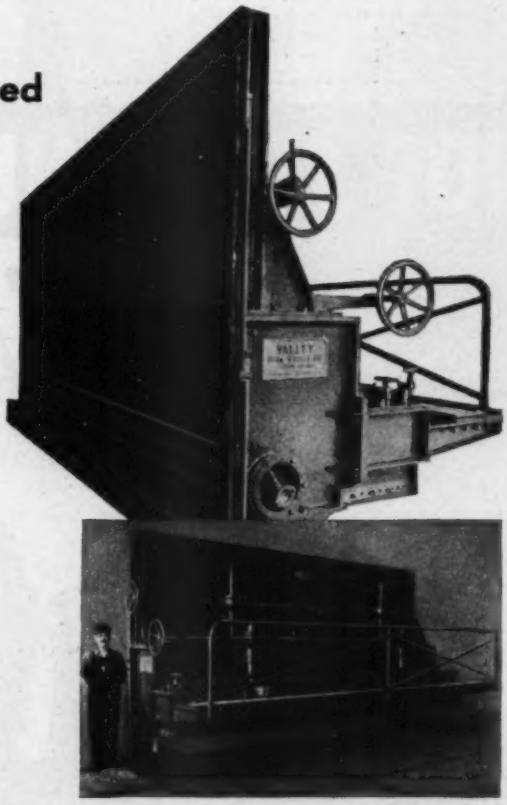
* * *

Nickel-Clad Steel, product of the Lukens Steel Co., has many properties that point to its widespread use in paper machinery of the future.

It consists of strong, rustless, corrosion-resisting nickel, extending to a depth of 10% or more of the total plate thickness, firmly bonded to steel. It has a minimum tensile strength of 55,000 lbs. and a modulus of elasticity of 30,000,000 lbs. per square inch.

Produced on the world's largest 206" plate mill, Nickel-Clad Steel is rolled, for example, in ¼" thickness up to 13 feet wide and 25 feet long in a single plate. Use of these large plates, as in the fourdrinier inlet, eliminates unnecessary weld joints, cuts down labor time and simplifies streamlined design.

Other pioneer Nickel-Clad Steel equipment now at work includes vats for cylinder molds, mixers for fillers and coating materials, fibreboard press plates, and stock regulating boxes.



THREE NICKEL-CLAD STEEL PLATES, *5/16" thick (10% solid nickel) and 215" wide, form the surface of this "Valley" High Speed Inlet. The distributor roll is fabricated from Monel. Photos, courtesy of Valley Iron Works, Appleton, Wis.*

For further information, write today for "Lukens Clad Steels" and Technical Bulletin T-4, "Methods for the Fabrications of Lukens Clad Steels."

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with decreasing amounts of the combined sizing agent. Therefore, when introducing the poly-carboxylic resin and rosin mixtures, it is advisable to approach the sizing peak from the low dosage side to eliminate the possibility of having a dosage beyond that which will give maximum sizing.

From a practical point of view the use of this sizing agent with rosin in the engine sizing process materially extends the limits of obtainable engine sizing and the amount of sizing agent necessary to cover this extended sizing range is considerably lower. It appears to be of particular benefit on papers where maximum engine sizing is desirable or where the amount of rosin permitted is limited.

Urea-Formaldehyde Resins in the Beater

ROBERT J. MYERS[1] and
GEORGE V. N. MORIN[2]

The war has created new demands upon the paper industry and performance requirements have been increased so that the desired goals can be achieved in a feasible manner only through the use of synthetic resins. One of the requirements has been that of higher wet-strength in paper products for military uses. (Zaumeyer, R. J., *Paper Trade J.*, 117:TS 1, 1943.) The higher production speeds and more severe service requirements have turned the attention of papermen to synthetic resins as a possible answer to their problems in the manufacture of map and chart paper, food wraps, bags, camouflage and other papers.

(1) Head applications laboratory, Resinous Products and Chemical Co.; (2) research chemist, Resinous Products and Chemical Co.

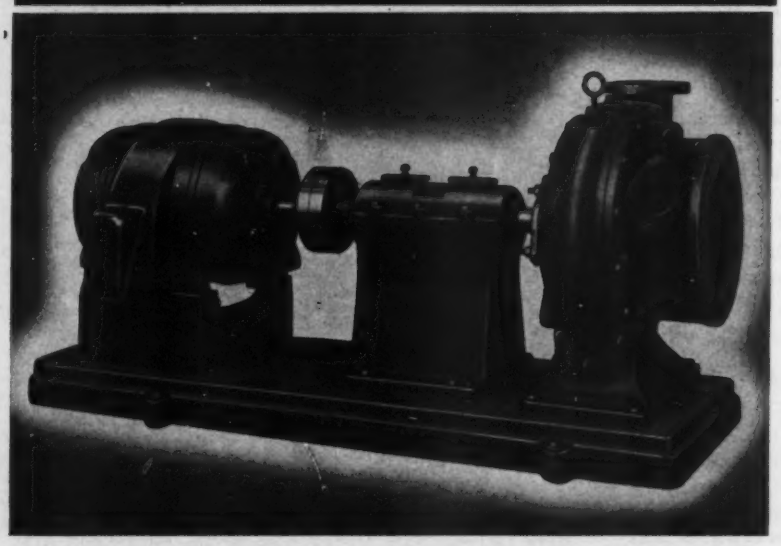
The use of synthetic resins in the production of wet-strength paper has been reviewed by Myers (*Paper Trade J.*, 110, No. 15:27-30, April 11, 1940) and Collins (PAPER IND. AND PAPER W., 25:263, 1943). It has been pointed out that one of the most interesting resin types for paper applications is the urea-formaldehyde resin. The urea-formaldehydes present interest for several reasons: they may be prepared as water soluble materials, of low cost, they are thermosetting, and are characterized by freedom from color, odor and taste. In addition the urea-formaldehyde resins show a unique property of chemical combination with cellulose. The combination of these resins with cellulose was considered by Taft (*Paper Trade J.*, 112, No. 10:34-38, March 6, 1941; *Tech. Assoc. Papers*, 24:288-292, 1941) to be the basis of the successful use of urea-formaldehydes in the tub sizing of paper to produce wet strength.

As pointed out by Taft, the most desirable point in the papermaking processes to apply urea-formaldehyde resin would be at the beater since this would offer the advantages of a homogeneous sheet, full use of the entire dryer section and no added equipment installation. Until recently, however, attempts to employ water-soluble resins in the beater have been unsuccessful because of the high losses in the white water, and the relative ineffectiveness of resins sufficiently water soluble to permit their use. From the standpoint of the resin chemist, the use of a resin in the beater demands a polymer which shall be soluble in neutral and slightly acid media, show a high degree of chemical combination or physical adsorption toward swollen cellulose fibers at very low concentration, and be capable of conversion to an insoluble form in the limited time and at the temperature of the average dryer section. Further objectives such as low cost, flexibility in application, and a minimum of special equipment or chemicals may be added. Experience has shown that the ordinary urea-formaldehyde resins do not satisfy these requirements and are quite ineffective in the beater. On the other hand, Maxwell (*Tech. Assoc. Papers*, 26:309-312, 1943) and Zaumeyer (*Paper Trade J.*, 117: TS 1, 1943) have recently indicated that certain melamine-formaldehyde resins, if condensed in the presence of strong acid, impart wet-strength to paper when applied at the beater.

In continuance of the studies by Taft, synthetic organic research has recently led to the development of a new type of urea-formaldehyde resin with interesting properties. One of these resins (Uformite 466) appears to satisfy all the requirements enumerated above for an acceptable beater-size. Laboratory studies have been made on the characteristics of paper prepared with the new resin and field trials have been made which substantiate the laboratory findings.

The resin employed is produced as a light straw-colored water solution, 49 per cent to 51 per cent resin solids, with a

NOT *SIX* MINUTES
. . . BUT *THREE*



is the time taken by a Warren Type SOD Pump in which to fill the Beater in one of the efficient rag mills that have made Western Massachusetts so well and favorably known in the fine paper field. This particular pump was bought to do the job in *six* minutes but the reserve capacity cut the time exactly in half.

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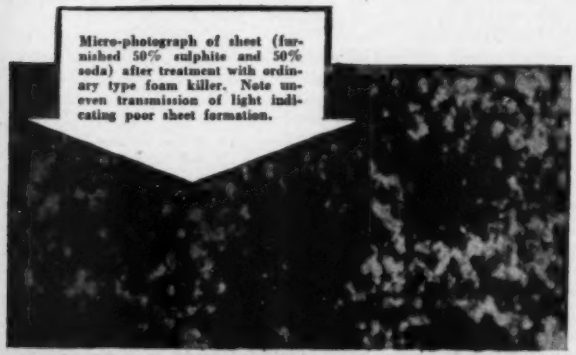
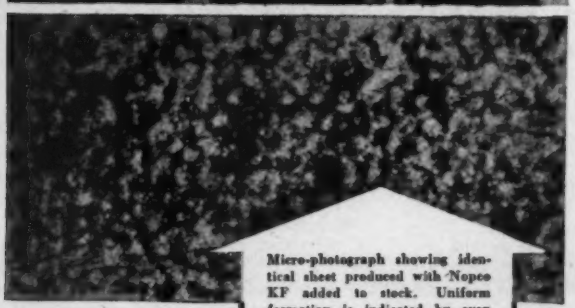


Micro-photograph of sheet (furnished 50% sulphite and 50% soda) after treatment with ordinary type foam killer. Note uneven transmission of light indicating poor sheet formation.



Micro-photograph showing identical sheet produced with Nopco KF added to stock. Uniform formation is indicated by even distribution of light and dark area.

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*p*H of 7 to 8, and a specific gravity of 1.23 to 1.25. The viscosity of the original solution varies from 1.4 to 3.0 poises (F-L, Gardner-Holdt scale) and this decreases rapidly upon dilution. The resin solution was found to be infinitely dilutable with water at or above 50 Fahr., hence the resin may be added directly to the furnish at any concentration from 10 to 50 per cent. In common with the conventional urea-formaldehyde resin solutions, the new resin shows a limited life in storage but the useful life is considerably extended at lower concentrations, hence, storage of the diluted solution before use is feasible and advisable.

Taft (*Paper Trade J.*, 112, No. 10:34-38, March 6, 1941; *Tech. Assoc. Papers*, 24:288-292, 1941) discussed the four factors which influence the cure of urea-formaldehyde resins, namely *p*H, temperature, concentration, and time, and indicated that *p*H was possibly the most important. The new resin type cures in the same manner as the conventional urea-formaldehyde resins described by Taft. The low *p*H necessary for the cure of the resin may be obtained by the use of any acidic material but aluminum sulphate, in particular, shows a beneficial effect (as judged by attainment of wet tensile values) which is in excess of its ability to lower *p*H.

The curing of a urea-formaldehyde resin is a very complex reaction and in actual practice, such as the curing of a resin in the paper sheet as it passes through the dryer section, it is extremely difficult to evaluate the relative contributions of temperature, time, and concentration since all three variables are changing but not to the same degree. To further complicate the problem, consideration should also be given to the temperature coefficient of the rate of cure induced by the catalyst since some catalysts are more effective than others at elevated temperatures even though the *p*H values induced by the catalysts are identical. All of these variables combine to render even laboratory studies difficult to interpret and in an application study, general relationships are to be sought rather than small differences.

It is sufficient to insure that the time required for passage through the dryer section is adequate to dry the paper, since the temperatures attained and the time required are enough to initiate the cure of the resin, which appears to proceed further at room temperature to the full value within one to eight days. A rapid check on the performance to be expected may be made by heating a sheet taken directly from the machine for 15 to 60 minutes at 210 Fahr.

The entire problem of the binding of resins by cellulose fibers offers promise of most interesting results to be obtained from fundamental studies which would, however, require more refined techniques than those employed in this work.

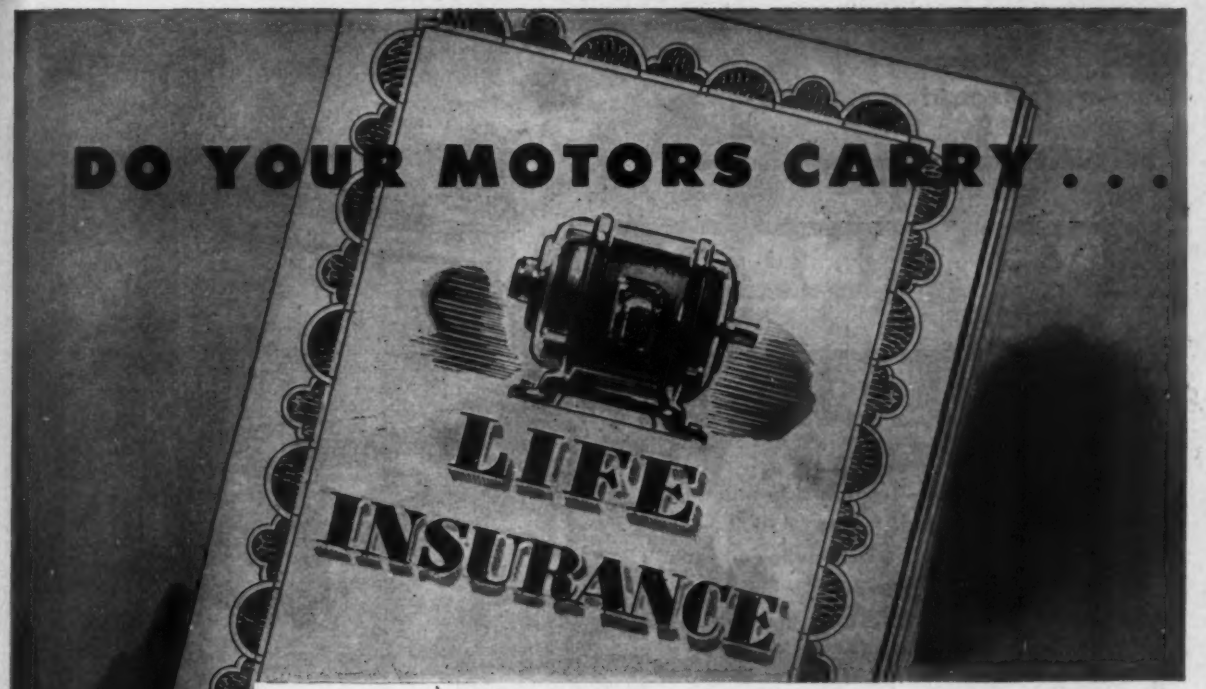
It is worthy of note that in general the wet strength is doubled with 0.4 to 0.6 per cent resin added, tripled with 1 to 2 per cent resin, and quadrupled in two cases with as little as 2.5 per cent resin added. With the ordinary types of kraft, soda and sulphite pulps, it appears possible to obtain, with no more than 3 per cent resin, based upon the dry pulp, a wet strength expressed as per cent of dry strength based on either burst or tensile values of 30 to 50 per cent. The actual value that will be obtained in any specific case will vary with the type of furnish, *p*H, aluminum sulphate concentration, speed of machine, temperature of dryer, and other factors.

A brief study was made of the wet strength developed by the resin when added to kraft and sulphite pulps beaten to different degrees of hydration.

From the practical viewpoint it will suffice to point out that the hydrated cellulose, which is generally considered the cementing medium in paper formation (Clark, J. d'A., PAPER IND. AND PAPER W., 25:382, 1943) and the basis for the increased dry tensile of the more hydrated paper, appears to react in a specific manner with the new type urea-formaldehyde resin (and with certain melamine-formaldehyde resins) so that the advantage in dry tensile is carried over into wet sheets when the resin is present to lower the water sensitivity of the hydrated material.

Laboratory experiments were made to study the effect of the point of addition during the beating period, the effect of the time between resin addition and the curing of the sheet, and the effect of the order of addition of aluminum sulphate and resin.

There appears to be no significant loss of wet strength when the resin is present during the beating period or when the



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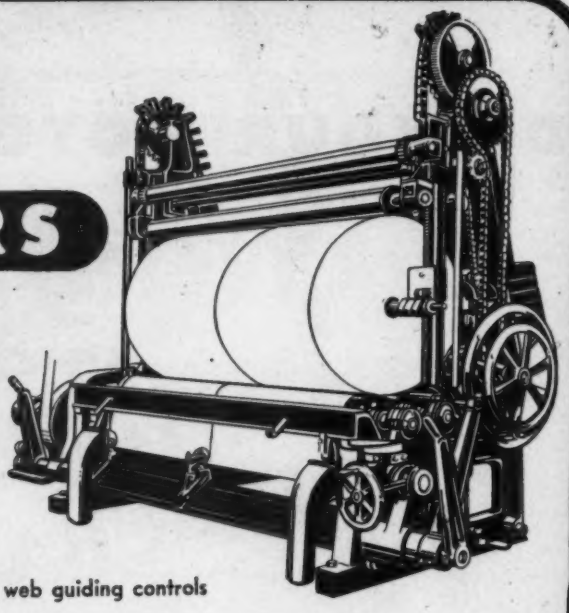

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sheet is made within 24 hours of the time the resin is added to the pulp. The combination of the resin with the cementing substance appears to be a rapid reaction and results in a firm combination which survives mechanical treatment. It is better to add the catalyst before adding the resin.

Three per cent resin (on pulp solids) was added to beaten sulphite pulp (1 per cent) at 110 Fahr. and after 30 seconds the sheet was formed at that temperature. The wet strength developed in this manner was the same as that developed when the pulp was at 80 Fahr. Since the rate of most chemical reactions double with each 18 Fahr. rise in temperature while the temperature coefficient of adsorption from solutions is very small, it is probable that the reaction between the resin and the cementing substance is extremely rapid (quite surprising, if true, since a condensation reaction appears to be involved) or the reaction is a type of adsorption of the resin on the hydrated gel formed during the beating process.

The use of the common addition agents such as rosin, starch and the like does not appear to have any effect on the wet strength values developed by the use of the new urea-formaldehyde resin. Rosin size, in general, tends to lower dry tensile while the urea-formaldehyde resin increases the dry values and when used together they tend to offset each other. The wet tensile and burst values are just less than additive when 2 per cent rosin size and 3 per cent urea-formaldehyde resin are used on kraft pulp.

The wet strength imparted by the use of the resin is of a superior type and is retained over long periods of time when the paper is wet with water or with a solution of a wetting agent. The wet tensile values obtained with the aid of a wetting agent are slightly lower than those obtained with water alone but no decrease with time is noted as is common in the case of rosin size.

Stability studies on papers treated with the new resin are in progress under a variety of conditions of humidity and temperature and a detailed report will be made at a later date. At present, it can be said that the stability shown is of a high order and is at least as good as that shown by the common urea-formaldehyde resin tub sizes.

The rework of broke is a problem that varies with the type of stock, processes available and amount of effort that can be spent on it. Wet broke from paper treated with the new resin has been handled like the broke from the usual urea-formaldehyde resin treated paper. Wet broke or fresh dry broke can be handled without difficulty.

Paper Problems in Telephone Apparatus

DAVID A. McLEAN, Chemist, Member of the Technical Staff, Bell Telephone Laboratories

The critical uses of paper in communications equipment are those wherein it forms an electrically insulating component of apparatus as in telephone cables, dielectric for condensers, and inter-leaving for coils, relays and transformers. In such apparatus large areas of very thin paper must retain their insulating quality for many years.

In the manufacture of telephone toll cable, copper wires are wrapped with paper tape at a rate of some 3,000 rpm. The insulated wires are cabled and dried and the cables then covered with an extruded lead-alloy sheath. Most exchange area cable is made by forming a ribbon of paper on the wire directly from the pulp, using a cylinder machine. This ribbon is polished around the wire to form the insulating covering, after which the insulated wires are cabled, dried and sheathed as for toll cable (Little, J. S., *Paper Trade J.*, 96, pp. 29-32, 1933), (Walker, H. G., and Ford, L. S., *Bell System Tech. Journal*, 12, pp. 1-21, 1933), (Little, J. S., *Bell System Tech. Journal*, 20, pp. 82-94, 1941).

The properties of the cable are dependent to a large degree upon the chemical and mechanical properties of the paper (Finch, J. M., *Industrial & Eng. Chem.*, 32, 1021-1028, 1940). Chemical purity, in the sense of freedom from electrolytes, is necessary to insure against undue embrittlement during processing. Mechanical strength and flexibility insure that the paper will withstand the severe mechanical treatment of the insulating operation. As low density as is compatible with high mechanical strength and rigidity of structure is de-

sirable to minimize the capacity and conductance between conductors. Uniformity of composition and structure contribute to uniform and satisfactory cable characteristics. Because of the low voltage used in telephone cables, dielectric strength and life requirements are readily met, in contrast to power cable in this respect.

The paper condenser comprises a winding of two metallic foil electrodes interleaved with paper in sufficient thickness to withstand, after drying and impregnation with a suitable filling agent, the anticipated service conditions.

Probably nowhere is more expected of an organic material than is demanded of paper in electrical condensers. In certain types of condensers the dielectric must withstand d-c. potentials corresponding to a stress of about 500,000 volts per inch of dielectric thickness for long periods of time, even at high ambient temperatures. The instantaneous dielectric strength of the thin dielectric in a paper condenser is as high as 5,000,000 volts per inch of dielectric thickness, or about 60 times the dielectric strength of air for 1 inch electrode spacings at normal atmospheric pressures.

The manufacture of condenser paper of excellent mechanical properties and high chemical purity in closely controlled thicknesses down to .0003 inch is a manufacturing achievement of the paper industry.

Despite the generally excellent performance of paper condensers, there is a continuous demand for improvements which will permit still higher stresses, higher operating temperatures, or will provide greater margins of safety. This demand has been considerably augmented by military needs, which require communication equipment which will operate reliably under severe conditions of voltage, temperature, and mechanical shock. For these reasons, paper condensers provide some of the most challenging paper research problems, an illustration of which is given.

Paper condensers employing aluminum foil electrodes and chlorinated impregnating compounds have served the purposes of the telephone plant adequately for a number of years in places where temperatures and voltages are moderate. However, as the demand arose for more compact apparatus and for condensers to operate at higher d-c. stresses and at higher temperatures, laboratory tests showed that this combination as it stood did not provide a comfortable margin of safety. In investigating this situation, it was noted that condensers containing kraft paper performed much better under accelerated testing conditions than condensers containing linen paper of comparable chemical purity. The difference in performance manifested itself in several ways. Most important, life tests at elevated temperatures and voltages showed the kraft paper condensers to have a life four or five times as long as similar linen paper condensers. When a potential was applied to linen paper condensers held at elevated temperatures and continuous measurement was made of electrical leakage through the dielectric, the decomposition of the insulating components as manifested by a rising leakage current was much more rapid than for kraft paper condensers. Finally, when

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condensers were dismantled after failure or shortly prior thereto, many decomposed areas were found scattered throughout the paper. These areas were brown and embrittled, giving evidence of partial carbonization. Such regions appeared much earlier in linen paper than in kraft. Only when tested under higher voltages do the kraft papers show decomposition in a time comparable to the linen paper at 120 volts.

This, then, was a problem that challenged research: Here were two simple structures having only three components; paper, impregnant, and electrodes, and both identical except for the paper, yet showing widely different characteristics when subjected to d-c. voltage. The linen paper was composed of relatively pure cellulose fibers whereas the kraft contained relatively large amounts of lignin, pentosans and ash. It had been generally assumed that linen paper, because of its purity, would perform equally as well if not better, and it was therefore somewhat surprising to find the kraft to be substantially better. The initial object of the research project growing out of this observation was that of determining the cause of this difference in performance.

The first chemical work consisted of determination of the impurities in the decomposed areas of failed or nearly failed condensers. It was soon established that these areas contained free hydrochloric acid. This was determined by one of the microchemical techniques widely used in modern telephone research. A section of linen paper containing decomposed areas was covered with a sheet of indicator paper impregnated with barely alkaline phenolphthalein. The indicator was decolorized in spots corresponding exactly to the decomposed areas, demonstrating the presence of acidity. Another sheet of paper containing decomposed areas was similarly treated with a silver chromate indicator paper used in the detection of chlorides. This indicator gave a definite positive reaction for chlorides in the decomposed areas. This demonstration of the presence of acidity and the presence of free chlorides is, of course, equivalent to the demonstration of the presence of hydrogen chloride.

Since the condenser paper used in these studies was extremely low in chlorides (about .004%) it was obvious that the source of the chloride ion was the chlorinated aromatic impregnating compound. It was known that such compounds decompose to give hydrogen chloride under the influence of the electric arc or strong ultraviolet light. It now appeared that they would decompose under the conditions existing in a condenser. Strong evidence has been obtained at our laboratories that this decomposition is activated by the metal electrodes. This primary decomposition, however, is very limited in rate and amount, and probably of itself would not be perceptibly harmful. One can heat the condensers for very long periods without serious degradation so long as no voltage is applied; when d-c. stress is applied, however, rapid depreciation of electrical properties results. The process of this depreciation is pictured as follows: The minute quantities of hydrogen chloride liberated are electrolyzed, aluminum chloride being formed at the aluminum anode. Aluminum chloride is well known to be a powerful agent for the degradation of organic compounds. The most important action of aluminum chloride in the condenser is to further decompose the chlorinated impregnant, providing more hydrogen chloride, providing more aluminum chloride, and so on until failure. This theory accounts for the autocatalytic form of the current-time curves and for the specificity of these curves with respect to type of electrode metal used (McLean, D. A.; Egerton, L.; Kohman, G. T., and Brotherton, M., *Ind. & Eng. Chem.*, 34, 101-109, 1942). It should be pointed out in the latter connection that despite these reactions associated with aluminum electrodes, aluminum is in most respects superior to other metals available in foil form at reasonable cost.

Since the decomposition was pictured as a vigorous reaction of the self-accelerating type, it seemed likely that whatever kraft paper was doing, it was doing during the early stages of the reaction when small chemical variations might easily influence the whole course of events to follow. Hence, it was postulated that kraft paper was able to absorb, neutralize, or otherwise inactivate, the small quantities of hydrogen chloride formed in the primary decomposition reaction. It was further postulated that linen paper was either incapable of this action or limited in capacity. The experimental proof of this point was simple

but convincing. It was found that if a certain amount of kraft paper was immersed in any dilute acid, it would neutralize in the neighborhood of 0.06 to 0.10 milli-equivalents for each gram of paper, three to four times as much as an equal quantity of linen paper. This experiment has been performed on scores of samples, and while both linen and kraft papers vary in exchange capacity, the level for kraft papers is far above that for the linen. (McLean, D. A., and Wooten, L. A., *Ind. & Eng. Chem.*, 31, 1138-1143, 1939). It thus appeared reasonable to conclude that the papers, by serving as acid buffers, delayed the onset of decomposition, the kraft paper for a longer period because of its greater capacity.

The acid neutralization by both types of paper was found to be explained by the familiar base exchange concept (McLean, D. A., and Wooten, L. A., *Ind. & Eng. Chem.*, 31, 1138-1143, 1939), (McLean, D. A., *Ind. & Eng. Chem.*, 32, 209-213, 1940), the hydrogen of the acid exchanging for chemically bound metallic cations constituting the ash of the paper. The exchange capacity was found to be directly proportional to the ash after a small allowance is made for the inert ash, principally silica.

One might say at this point the original object of the investigation had been achieved, but had the investigation stopped here, it would simply have explained an interesting phenomenon and would have been of little practical or economic value. The various extensions of the original research, however, resulted in condensers which will withstand accelerated testing conditions about 100 times as long as the early linen paper condensers, about 25 times as long as the early kraft condensers.

◆

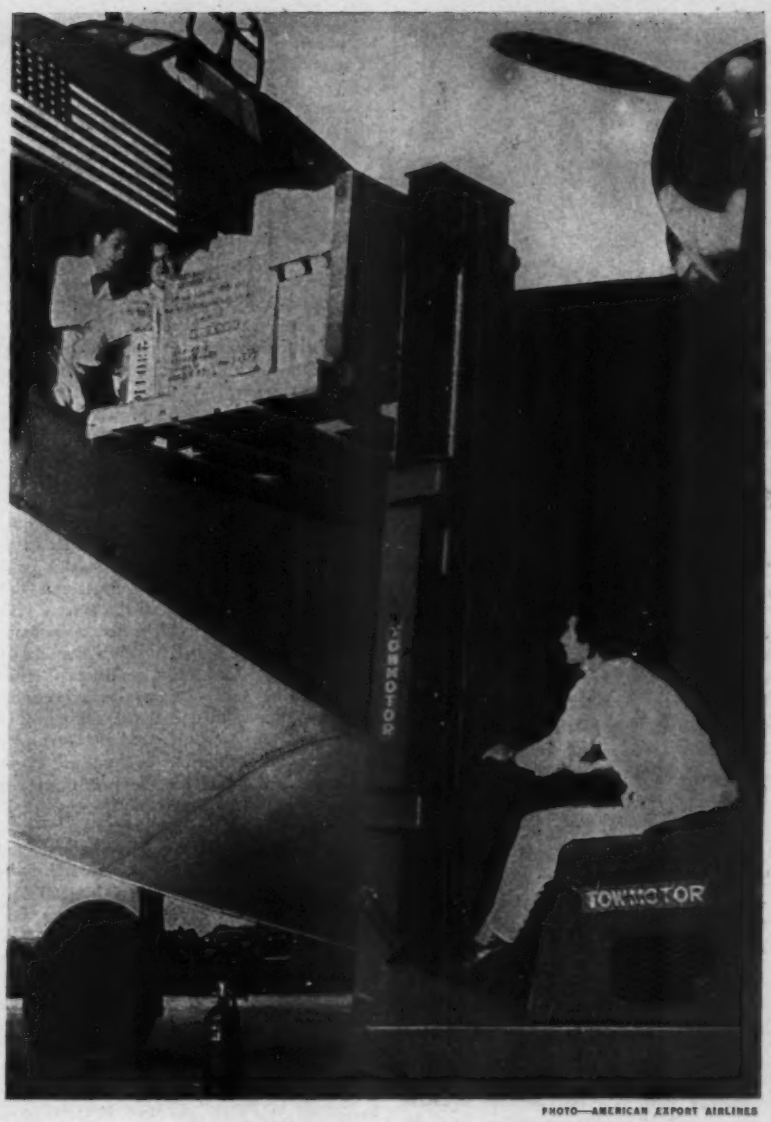
Metallographic Examination of Plant Equipment*

MURRAY M. RUBIN, Consulting Engineer

Metallography may be defined as a science correlating the study of the internal and microstructure of metals and alloys with the physical and mechanical properties of these present day strategic and critical solid materials. It has always been an important division in the field of physical metallurgy, and of vital significance now in the national war program. This phase of mill engineering has been stressed mainly by equipment manufacturers allied with the pulp and paper industry, and largely neglected by both paper mill chemists and plant engineers. Abroad knowledge of the optimum utilization of critical war metals and possible substitutes is a most important and effective means of conservation of such materials used in maintenance and economy of operation of pulp and paper mills.

Usually a sample (about ¾ inch square by ⅜ inch thick) of the material to be examined is required. A longitudinal, cross, or angular section is cut off with a hack or band saw, torch, or similar equipment depending on the nature of

(*) Abridgment of paper presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 15-18, 1943.



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the material and information required by examination of the desired area in the final polished flat surface. Small samples, such as metal wires, and larger samples in which it is desirable to examine the edges or casing as compared to the center or interior of the metal specimen are mounted in plastics to facilitate polishing and handling of the sample.

The surface must be absolutely flat and free from rough edges and burrs. This is accomplished by a rough grinding operation first by use of a flat power-driven horizontal belt covered with 1½ to 2/0 emery cloth as the abrasive. This is followed by intermediate and fine grinding operations performed by successfully rubbing the prepared metal surface in one direction only on special fine grit emery papers backed by plate glass. The grit numbers of these abrasive papers range from 1, 0, 00, to 000. All traces of burrs and deep scratches in the metal surface are removed thereby. Next follows a wet polishing or lapping process. This consists of moving the metal surface back and forth with moderate pressure along the surface of a flat rotating disk covered with broadcloth and wet with water, and sometimes with a suspension of fine alumina or magnesia in water. This emulsion of abrasive powder and water acts as a lubricant between the cloth and metal surfaces and repeated polishing of the metal surface yields a mirror finish free from all marks when examined under the microscope by vertical reflected illumination.

Metals and alloys are composed of crystals of characteristic fixed-grain size and arrangement, and these are revealed by properly etching the polished metal surface by rubbing or immersing in a suitable chemical reagent. The etched specimen is examined with a metallographic microscope at 100 or 300X magnification. For photomicrography with vertical illumination the writer has adapted the same reflex camera, roll film, and procedure as described in previous publication (Rubin, M. M., and Rubin, M. L., "Spots and Specks in Paper," (PAPER INDUSTRY AND PAPER WORLD, 21, No. 4:423-434 1939).

Photomicrographs in color were obtained by using B_1 photoflood 750 watt blue lamp, with variable resistance in the line, as the light source, Kodachrome film, and very short exposure time (½ second). For smaller color photos this camera was fitted with an adapter and filters to use roll film and with a regular 75 watt Mazda lamp. This micrometallographic equipment is compact, portable and of nominal cost.

The most important of the construction metals is iron. It alloys readily with several metals, advantageously with carbon and silicon and disadvantageously with sulphur, phosphorous, and oxygen. Combinations of iron and carbon yield various grades of plain carbon steels and cast irons. Silicon in small amounts up to 4.5 per cent increases the strength of iron; up to 14.5 per cent it gives materials of high resistance to acid corrosion, but very hard, brittle structures and poor in machinability.

Copper, used alone as in mill pipes, or with zinc or tin as brass or bronze alloy in fourdrinier wires is of the greatest importance. Copper is especially useful for

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fresh water and stock lines, since this metal has certain antiseptic qualities against waterborne microorganisms and assists thereby in keeping pipelines and stock free from slime. Brass alloys with more than 20 per cent zinc are susceptible to a form of corrosion called dezincification, which leaves the brass in a porous condition. Otherwise, copper and its alloys can be welded, bolted, and easily worked in the mill.

Nickel is a silvery, very hard, ductile, and tenacious metal of great strength and resistance to attack by alkalies. It has the remarkable property that it can be welded to steel plate at rolling heats so that nickel-clad steel plate can be fabricated of 10 per cent thickness of nickel and 90 per cent steel. It is easily workable and can be welded in the mill. Besides, nickel has long been used to improve the quality and properties of steel. With iron, and chromium in amounts over 12 per cent, it forms high-temperature, corrosion-resistant alloys such as stainless steel; and with copper forms Monel metal, which is a corrosion resistant alloy of great strength and durability.

Manganese is an important constituent as a deoxidizer in structural steels and hardener in alloy steels.

Molybdenum, like chromium, is highly resistant to acid corrosion and adds strength also when added in small amounts to alloy steels.

Aluminum has the advantage of light weight, great strength of its alloys, and lack of corrosion by dilute sulphuric acid or alum solutions in white water, but is easily attacked by caustic solutions, and HCl acid which render it of limited value in pulp mills.

Bearing metals for plain and sleeve bearings are composed usually of alloys of copper, lead, tin, antimony, and zinc, and are known as white metal, babbitt metal, brass, phosphor-bronze, etc. Nearly all the babbitt or white metal alloys are made of lead, tin, and antimony. From a cost standpoint lead and zinc are cheapest, but lead is too soft to be used alone. Antimony and copper are higher in price, and tin normally the most expensive. Antimony added to lead increases the hardness and brittleness, and addition of tin yields a tougher alloy. Original babbitt metal contains copper (3.6 per cent), tin (89.3 per cent), antimony (7.1 per cent) and possesses great antifrictional properties. It is used extensively as a lining for bearings, not only because of antifrictional qualities, but also because it is much cheaper than a machined box. In general, white metals are cheaper than red brass alloys and have a lower melting point, so that worn out bearings can be remelted easily and replaced. Also hard axles or shafting will operate more quietly for a longer time in a white metal than in a red brass bearing, and with less possibility of shaft scoring.

Several bronze-bearing metals, and especially phosphor bronze or deoxidized bronze, have good antifriction qualities and stand up well under heavy loads, high-speed shafts and severe usage in plain- and sleeve-type bearings. When a white metal bearing runs hot, the structure of the bear-

STAINLESS STEEL PARTS NOW CAST CENTRIFUGALLY

New Method Replaces Forging and Fabricating in Many Cases

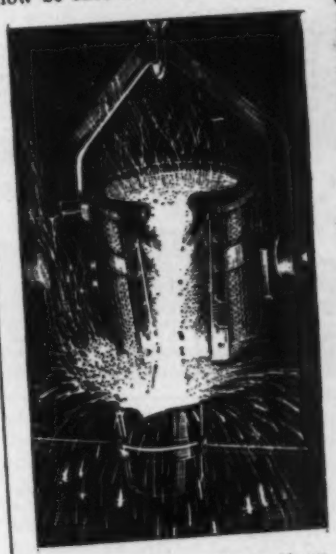
HILLSIDE, N. J.—A new method of casting stainless steel centrifugally has recently been developed by The Cooper Alloy Foundry Co. of this city. According to company spokesmen, parts formerly forged or fabricated can now be cast successfully—with resultant savings in cost, man-hours and delivery time.

Cooper has already demonstrated the ability of his new process to crack critical bottlenecks in the manufacture of mass-produced equipment for airplanes. Many such parts are now produced in record time.

Centrifugal casting of stainless steel, however, provides industry with much more than a new way to speed vital war production. It means that either the static or the new centrifugal method can be used —whichever is better, or more economical, or faster.

The Cooper Alloy Foundry Co., where the new process was developed, has specialized in the production of stainless steel, monel, nickel, chrome iron, chrome nickel and other alloy castings since 1922. It offers users of corrosion, heat and abrasion castings a complete alloy casting service—including practical assistance in the selection of alloys.

Concerns interested in the possibilities of this new process are invited by the company to submit descriptions



(with sketches) of the castings, fabricated parts or forgings they now use, together with notes on any special requirements. Company engineers will then make recommendations. Users will not be obligated in any way in taking advantage of this service.

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- Dual foundry . . . both hand and machine molding.
- Centrifugally-cast castings.
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- Castings furnished rough, polished or fully machined . . . one ounce to two tons.
- X-ray and Gamma-ray inspection.
- Development of special alloys to meet unusual requirements.
- Technical consulting service.

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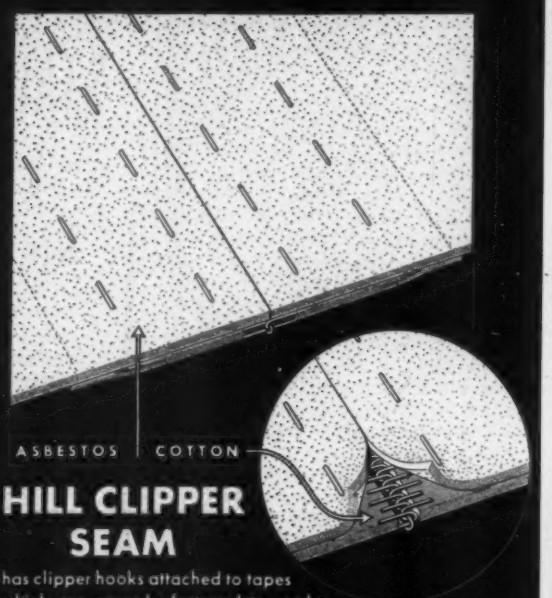

HILL CLIPPER SEAM

has clipper hooks attached to tapes which are securely fastened to each end of the felt in our factory. All that remains to be done in the mill is to thread the wire through the hooks. The outside of the felt then becomes practically an endless surface.

ASTEN FELTS

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ing alloy becomes more coarsely crystalline and its performance less favorable. Proper bearing design, construction maintenance, and operation is controlled easily by record of bearing temperature. Normally, bearing temperatures should not exceed 140-160 Fahr., and are checked most easily by measuring temperature of the bearing lubricant with a thermometer.

Tool or alloy steel balls are best for ball bearings. Ball and roller bearings are especially suitable for slow-running, heavily loaded bearings.

Synthetic plastic bearing materials are made from laminated resins or by impregnation of textile and paper with resin in liquid or solution state, but have a physical structure analagous to metallic bearing materials. The resin is of synthetic organic chemical origin, such as is formed by condensation in alkali or polymerization of formaldehyde or similar aldehydes reacting with phenol. The plastic sheets or impregnated fibrous materials are molded under heat and high pressure to produce dense, strong, tough, hard-surfaced material, resistant to corrosion, wear and abrasion, and have been used successfully for several years as a substitute for tin and copper-base metallic alloy bearing materials because of ability to withstand heavy and continuous loads. There is a cellulose-fiber-base constituent, varying from a soft absorbent chemical wood fiber paper to vulcanized rag stock or heavy textile fabric and the amount and properties of this component can be varied and controlled. This material is imbedded in a hard, wear-resistant matrix of synthetic resin, whose chemical composition and physical properties likewise can be varied and controlled to suit the use requirements of the finished product. Water, oil, and grease lubrication can be used with such synthetic plastic bearing materials. That no such change of crystalline microstructure and properties as indicated in metallic bearing materials can occur in plastic bearing materials which run hot is obvious, yet the ingenious composition and structure of plastics with or without cellulose fibers indicate how it can function with superior results for bearing materials as well as many other uses in pulp and paper mill

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equipment and machinery. Recently, papers have been impregnated with synthetic resins, the sheets cut with wing shaped patterns, piled in layers and formed into laminated airplane wings, boat hulls, and even substitutes for metal alloy dies by heating at 300 Fahr., at pressures as low as 250 psi. In this way paper in laminated plastics is filling the gap in the shortage of critical metals and synthetic plastics essential for the war effort.

The only alloys found suitable from practical and economy standpoints for filter screen or fourdrinier wire cloth manufacture are brass, phosphor bronze, and Monel metal.

The wire properties of prime importance to the wire weaver are tensile strength, ductility, and weldability; but to the paper manufacturer the resistance to bending, abrasion, and corrosion as reflected in wire life are considered more significant. From a metallurgical standpoint these properties are all related to the metal alloy composition, drawing, and annealing schedule, and the metal grain size or microstructure.

Shute wires are composed mostly of alpha brass, the copper content is usually 80 per cent or more and with the trend toward use of low-tin bronze to insure sufficient ductility and strength even in the cloth filler. The tin used in the copper alloy for phosphor-bronze warp wires ranges from 7 to 8.5 per cent. The formation of any delta bronze (Cu_4Sn), by improper alloy cooling is highly detrimental; because this component is very brittle, and this is reflected definitely in the alloy ductility. Phosphorous is present usually in amounts of less than 1 per cent. It forms extremely hard particles of Cu_3P, and while these are too brittle for use as bearings they form an excellent non-abrasive skeleton in the strong, tough bronze matrix of the metal structure and definitely promote wire life. Uneven heat penetration in annealing will result in poor distribution of the tin in the alloy. Also, poorly worked or annealed phosphor-bronze wire will yield some comparatively large crystals in the wire core and result in weakening of wire strength. The surface of warp wires must be smooth.

While many wire failures are due to fatigue, seam failure, edge cracking, and chemical corrosion, the primary cause of wire-cloth failure in good operating practice in approximately half of all wires used is abrasion and wear of the warp-wire knuckles. Factors which promote wire abrasion are machine speed, varying stock conditions, flat box covers, and suction roll surfaces and vacuum, and wet-end operating equipment. The location of the maximum total wire stress is on the lower knuckles of the bronze warp when the wire cloth curves over the suction or breast roll on the paper machine. All the wear affecting fourdrinier wire life occurs in the bronze warp wires, and by far the major percentage of the inside or bottom side of the bronze warp knuckles.

A record of wire caliper and use of a speedometer or mileage counter connected to the wire roll journal are recommended to control progressive wire wear at the machine and detection and elimination of excessive abrasive wear.

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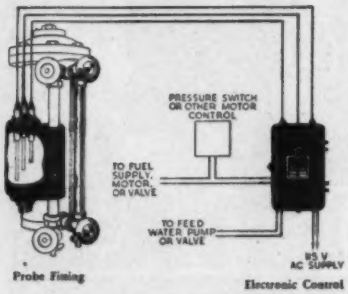
NEW EQUIPMENT AND SUPPLIES

Electronic Boiler Feedwater Control

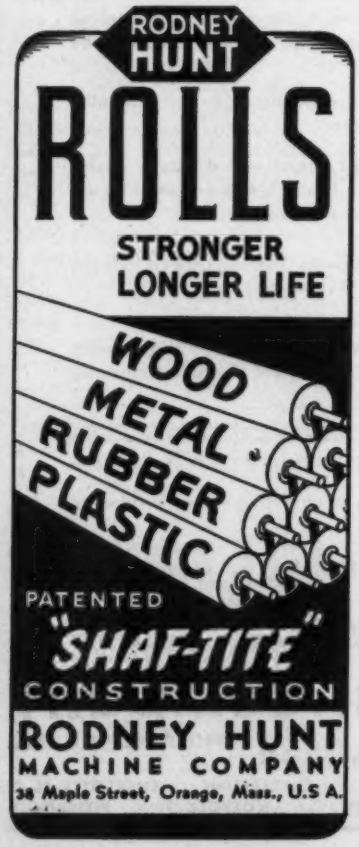
Combustion Control Corporation, Cambridge, Massachusetts, has announced FIREYE Electronic Feedwater Controls Series P156N, for maintaining constant boiler-water levels automatically, and for guarding against low-water hazards.


PRESSURE SWITCH OR OTHER MOTOR CONTROL
TO FUEL SUPPLY, MOTOR, OR VALVE
TO FEED WATER PUMP OR VALVE
115 V AC SUPPLY
Probe Fixing
Electronic Control

For automatic feedwater pump control and low-water protection, FIREYE Type P156N is used with Probe Fitting Type H53, as shown in the accompanying illustration. The probe fitting may be mounted parallel to the water column, or directly on the boiler, and is wired to the electronic control. These probes within Type H53 mark boiler feedwater pump on and off levels and a low-water danger point. The top and middle probes determine the high and low levels at which the boiler feedwater pump is turned on and off to maintain constant water level. When water falls below the middle probe, FIREYE closes the electrical circuit controlling the pump and water feeds into the boiler. When the level rises to the top probe, the water itself acts as conductor of a minute electrical current which operates the electronic control and turns off the pump. The pump remains inoperative until boiler water again falls to the level of the middle probe. The lowest probe defines the danger point below which boiler water must not fall. Should water drop below this safety probe, FIREYE immediately shuts off the fuel supply and sounds an alarm.

Types are available also for automatic pump control only, or for low-level protection only.

Controls are supplied as standard for boiler pressures to 300 pounds and for operation from a supply of 115 or 230 volts a-c. 60 cycles. The equipment governs solenoid valves, small horsepower pump motors, or pump motor magnetic starters. The probe housing is furnished in either cast or malleable iron, and the electronic control in a weather-proof pressed steel housing, both attractively finished in green crystal.



Self-Priming Pump

A self-priming pump designated as Type AO has been announced by Allis-Chalmers Mfg. Co., Milwaukee, Wis. The priming valve acts against a spring tension which governs the rate of priming and the static height of the priming suction lift. The automatic closing of the valve after complete priming prevents water from by-passing back to the suction chamber, with resultant power loss.

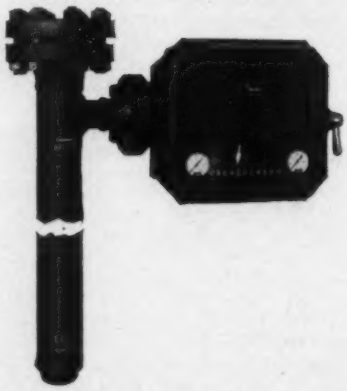
The pump impeller has an unusually thick vane with rounded inlet edges, permitting the pump to pass stringy materials and fairly large solids.

The entire line, which is planned to include sizes from 1 to 6 inches, will range from very small capacity to 1400 gpm and up to heads of 100 ft, or over.

The self-priming device incorporated in this pump is also adaptable to use with other pumps, particularly of the single suction type.

Liquid Level Controller and Indicator

An instrument, designated as the *Level-Buoy*, has been announced by Taylor Instrument Companies, Rochester 1, New York, for controlling and indicating levels of

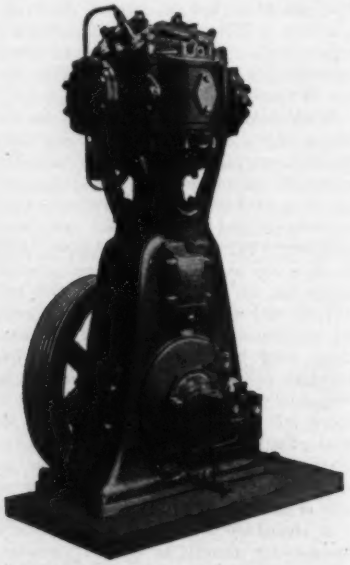


liquids with specific gravities between two-tenths and 2.0.

A torque tube transmits the level changes to the instrument mechanism. The instrument is available in the following standard ranges: 14, 32, 60, 72, and 120 inches.

Vertical Air Compressor

A single stage, double acting, water-cooled, vertical air compressor unit, designated as WG-9, has been announced by

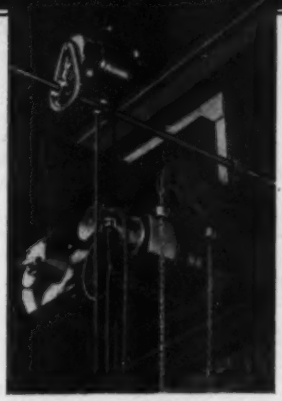


Sullivan Machinery Co., Michigan City, Ind. Large smooth air passages throughout the unit assure unrestricted air flow from intake to discharge. Truncated piston

MOTOR TRAVEL for Hand Traveled Crane Bridges

THE *Northern*

"TRAVELATOR"



Less than half a day required for application—no dismantling of crane—any good mechanic can apply the Northern "Travelator."

It provides pendant push button controlled electric power travel for hand traveled bridges within the range of 10 tons capacity.

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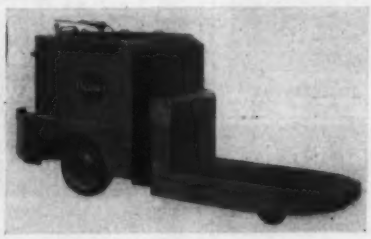
design gives large valve and head radiation area, and valve assemblies are accessible for inspection. The unit is designed for heavy duty, continuous 24-hour per day service.

3-Ton Low-Lift Truck

Baker Industrial Truck Division of the Baker-Raulang Company, Cleveland 13, Ohio, has announced a new 6000-lb. capacity low-lift truck. The truck, designated as Type E-3, is designed for operation in intersecting aisles 67 in. wide, has an over-all length of 123¾ in., an over-all width of 42¾ in. and an over-all height of 55 in. The platform is 26½ in. wide, 54 in. long, and 11 in. high in the low position, and has a vertical lift of 6 in.

The truck travels 4½ miles per hour with full load or 6 miles per hour empty on a level floor. Travel is controlled through a Baker No-Plug Controller providing three speeds forward and reverse.

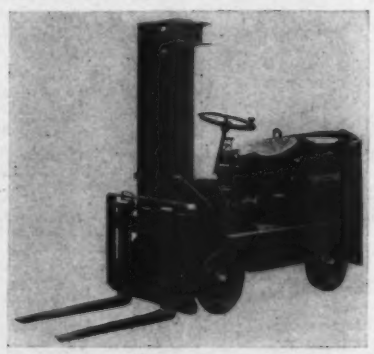
The platform travels vertically on ball-bearing rollers running in upright channel guides.



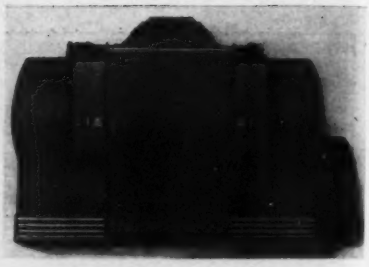
The frame consists of two fabricated plate sills running from one end of the truck to the other and terminating at the trailing axle in a box section. A rear entrance style operator's guard built integral with the frame provides safety for the operator.

Fork Lift Truck

Towmotor Corporation, Cleveland, Ohio, has announced Model LT-50 fork lift truck. Available in a 5000-lb. capacity with either 104 in. or 144 in. lift, or in a 4000-lb. capacity with 144-in. lift, the truck replaces Models LT-46 and LT-53.



Maximum travel speed of Model LT-50 is eight miles an hour; loaded lift speed, 40 ft. per minute. The truck has a 50-in. wheelbase, outside turning radius of 92 in., over-all width of 42 in., over-all length (less forks) of 88 in., and center underclearance of 6 in. Standard fork equipment is of 36 in. length.



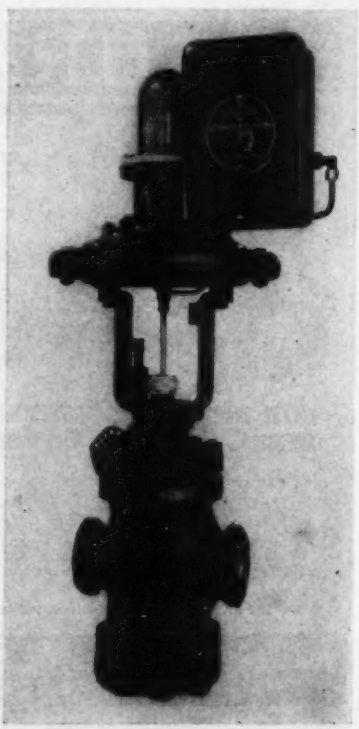
Kneading Machine

Struthers Wells Corp., Warren, Pa., has announced a newly developed kneading machine which features improved blade elements carried on antifriction bearings, closer blade clearances, and gears, bearings and all rotating parts totally enclosed and automatically lubricated.

The mixing chamber of the machine illustrated is provided with a quick acting cover and tiltable machines are equipped with motor or hydraulically operated dumping mechanism. Various types and construction are available for processing a wide range of different materials.

Positioner for Pneumatic Motor Valves

The Foxboro Company, Foxboro, Mass., has announced a new *Vernier Valvactor*—a micro-positioner for pneumatic motor valves. Actuated by air pressure changes as slight as the equivalent of ½ inch of water, the device can compel valve stem movements as small as 1/1000 of an inch. Continuing the same operating principles or the earlier design, the new construction involves a different arrangement of the actuating elements. In addition, the new unit makes use of flexure type bearings in place of pivots.



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Just now we are building machines for propelling bullets into the heart of the Axis. Tomorrow we'll build printing presses for you and your customers' needs.

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Paper from Ulla Grass

This represents an orienting study at the Forest Research Institute at Dehra Dun (India) of a raw material, ulla grass *(Themeda arundinacea)*, which is quite widespread in India. Evidently it is a promising papermaking fiber, or will be when the abnormally high cost of equipment is restored to normalcy. Wrapping paper can be made from the grass economically, by the sulphate process, and the average yields of pulp were about 48 per cent. Experiments with mixed furnishes indicated that it was best to make the paper from 100 per cent ulla grass, even though on occasion the mixture gave rise to improved physical properties. Tabulated data are given in World's Paper Trade Review, 120, No. 3, 145-6; No. 5, 253-4 (July 1943).

Yucca Fibers of New Mexico

The yuccas, native to New Mexico, that have been used in cordage and in the manufacture of certain papers are *Yucca glauca, Yucca elata, Yucca baccata,* and *Yucca macrocarpa.* The latter, however, despite its high yield, suffers from the disadvantage of a scattered stand. Besides these fibers there is a coarse grassy plant, termed a "nolina." Of all of these the *baccata* and the *macrocarpa* varieties are the strongest, and are as strong or stronger than Manila hemp (which is one of the toughest of the commercial fibers). Nolina is somewhat weaker than is jute or African sisal, but all the others are as strong as those hitherto used in cordage and bag manufacture. *Yucca glauca* is being used commercially in the manufacture of a special type of paper used by the Navy. A by-product of the yucca roots is saponin which also deserves commercial consideration. C. W. Botkin. Chemurgic Digest 2, No. 21, 198 (Nov. 1943).

The "Trityl" Ether of Cellulose

The authors have made a detailed study of the preparation of the trityl ethers of cellulose (i.e. the triphenylmethyl ethers). The products obtained contain about 1.0 to 1.2 trityl groups per glucose unit and, if the proper precautions are taken, there is little degradation of the cellulose although detritylation does cause appreciable fission unless special conditions are used. The degradation of "detritylation" can be largely avoided by using HCl in an organic solvent. Tritylation occurs 13.8 times as fast with the primary alcoholic hydroxyls of the cellulose as it does with the average of the secondary hydroxyl groups. Under moderate conditions 90 per cent of the primary hydroxyls may be covered with simultaneous reaction of only a small fraction of the secondary alcohol groups. W. M. Hearon, G. D. Hiatt, and C. R. Fordyce. J. Am. Chem. Soc., 65, 2449-52 (1943).

Degree of Pulping and Heat Developed on Chlorination

Unbleached pulp, when treated with chlorine at room temperature and ordinary atmospheric pressure, reacts to an extent that depends on the amount of lignin (and other encrusting materials) that are present. At the same time heat is evolved, which appears to be directly correlated with the cooking degree of the pulp. The author has described a method for measuring the quantity of heat which is evolved, a prerequisite being that the pulp samples are all dried to the same moisture content. Determinations were made with unbleached sulphate pulp, and the data are presented graphically. The heat of reaction causes a temperature increase in the sample which is a measure of the degree of pulping. (The article is in Swedish.) S.—O. Sandberg Svesnsk Papperstidn. 46, No. 10, 229 (1943); through B. I. P. C. 14, 45.

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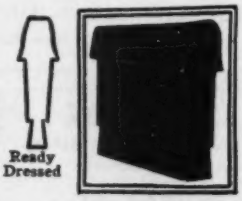

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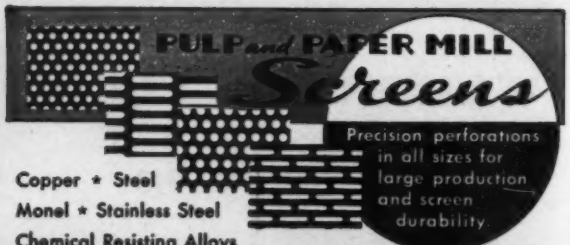

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You will also receive a complimentary copy of our Accident Facts Memo. No. PP-1, "Hand Tool Accidents in the Paper Industry."

New Catalogues and Publications

General Electric Co., Schenectady, N. Y.—The fundamentals and various applications of electronic control are described in a new 12-page bulletin. Well illustrated, the booklet explains in simple language, electronic tubes and their operation, and lists the functions of some of the more widely used industrial-type tubes. The practical applications of electronic control are covered, as well as photoelectric installations, and the various advantages afforded by the use of electronic control. Request Bulletin GEA-4126.

Bulletin ET-12 is a new 4-page quick-selection chart of electronic tubes for industry, and is being sent by the company to distributors.

Morse Chain Co., Ithaca, N. Y.—Bulletin No. 43, an 80-page illustrated brochure, supplies recent and complete information on Morse silent chain drives. In addition to specifications and price lists, the publication covers advances and developments in the chain drive and other fields. New and simplified methods of drive selection are included, also engineering data covering chain and sprocket construction, and a comprehensive list of stock drives based on a new, quick method of selection. Installation and maintenance of equipment also are outlined. Roller chains, flexible couplings and free-wheeling clutches are covered in a supplement. Copies gratis.

National Safety Council, Inc., 20 N. Wacker Dr., Chicago, Ill.—The January issue of "Industrial Safety Review" now is available. This 16-page magazine lists officers for the current year, reprints and condensations of safety articles, highlights the Thirty-second National Safety Congress and Exposition held in Chicago last October, and stresses Safety.

W. A. Taylor & Co., 7300 York Rd., Baltimore 4, Md.—Of value to every paper plant engineer and operator is a revised 83-page combination hand book and catalogue. Fifty pages are devoted to (1) a simple, non-technical explanation of the meaning of pH control and the methods for making colorimetric determinations; (2) precautions to be observed; (3) discussion of the application of pH and chlorine control to 31 different fields, including paper manufacture, and (4) a technical discussion of the meaning of pH control. Request free copy.

Whiting Corporation, Harvey, Ill.—Unit 68 is a 2-page bulletin on automatic welding cranes—a design developed to facilitate the handling of large welding jobs. The use of this equipment in welding, and its applications and specifications, are outlined. Write for copy.

Books

Covel-Hanchett Saw and Knife Fitting Manual—This book now in its fifth edition, is an extensive treatise on the care of saws and knives. Constituting the expression of a considerable number of saw makers, saw filers, and mill experts, the volume is very diversified as to subject contents. A few of the subjects treated in the book, just to highlight the contents, follow: Band Saw Tensioning; Alignment of Band Mill; Fitting Band Saws for Sawing Frozen Logs; The Life of Band Saws; Emery Wheels for Band Saws; Grinding Machine Knives; Paper and Pulp Mill Knife Grinding; Pattern and Carpenter Shop Tool Grinding; Filing; Cut-Off Circular Saws; Pointers on Circular Saws; and How to Operate Automatic Circular Saw Sharpening Machines.

The book, nicely illustrated, is durably bound in a stiff, black cover with overprinting in gold. The price of the book is $5.00 a copy; the publisher, Covel-Hanchett Co., Big Rapids, Mich.

Plastics Catalog (1944)—This volume, compiled with the assistance of leading technical authorities in the plastics industry, constitutes the eighth edition of the publication. It contains more than 1,000 pages of information, covering materials, processes, engineering, machinery, techniques and finished products.

Among the new materials covered by the contents are allyl resins, laminac resins, ion exchange resins, plastics from agricultural products, Nylon molding powder and synthetic resins in the paper industry.

New techniques in manufacture are dealt with in chapters on Molding with High Frequency Power, Casting Thermoplastics, Blowing of Thermoplastics, Low Pressure Molding of Laminates, and Fabricating Polystyrene.

Expanded outlines for plastics in the adhesives and coatings field are recognized with articles on coatings for paper, coatings for textiles, and a new chart of plastics used in liquid coatings.

A section on Tests and Specifications is an innovation with this issue. The section includes procedures on the identification of plastics, a list of standard testing methods, and the approved A.S.T.M. specification for plastic materials.

Also included in this volume is a directory and index section covering plastics manufacturers, a glossary of commonly used terms, bibliography, and list of educational institutions sponsoring plastics courses.

The publisher of the book is the Plastics Catalogue Corporation, 122 E. 42nd Street, New York 17, N. Y.; the price, $6.00 a copy.

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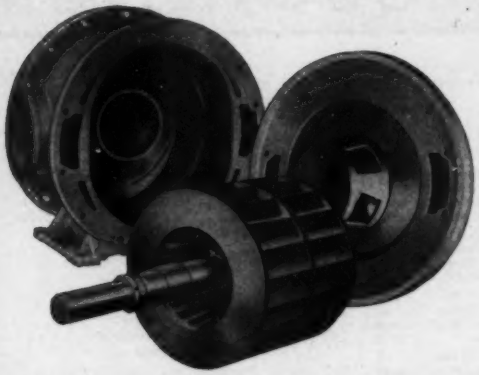

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CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

OPA ceiling prices in sales to consuming mills delivered buyer's usual receiving point, with brokers' allowance not in excess of 5 per cent.

	per cwt.
Blue Overalls	-5.50
Corduroy, Men's	-3.50
Corduroy, Ladies'	-3.00
Washables, No. 1	-3.00
Percales	-4.75
New Soft Blacks	-3.75
Light Prints, No. 1	-4.50
Khaki Cuttings—	
Bleachable	-4.25
Unbleachable	-3.50
New White Canvas	-6.50
New Mixed Blacks	-3.25
Canton Flannels, Bleached	-7.00
Shirt Cuttings—	
New White No. 1	-7.25
No. 1 White Headings	-7.25
White Shrunk	-5.00
Silesias No. 1	-5.75
New Unbleached	-7.50
Fancy	-3.50
Linen Cuttings—	
American	-5.00
White	-14.00
Grey	-14.00

RAGS (Domestic)

f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowances of $1 to $2 a ton depending on the value of the grade involved.

Roofing—	per ton
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
Whites, No. 2—	
Repacked	58.00
Miscellaneous	53.00

RAGS (Foreign)

ex dock New York City

NEW RAGS — per cwt. — Nominal

New Dark Cuttings
New Mixed Cuttings
New Light Silesias
Light Flannelettes
Unbleached Cuttings
New White Cuttings
New Light Oxfords
New Light Prints

RAGS (Foreign)

ex dock New York City

OLD RAGS — per cwt. — Nominal

No. 1 White Linens
No. 2 White Linens
No. 3 White Linens
No. 4 White Linens
No. 1 White Cottons
No. 2 White Cottons
No. 3 White Cottons
No. 4 White Cottons
Extra Light Prints
Ord. Light Prints
Med. Light Prints
Dutch Blue Cottons
French Blue Cottons
French Blue Linens
Checks and Blues
Linsey Garments
Dark Cottons
Old Shoppertes

ROPE and BAGGING

f. o. b. and ex dock New York City

Gunny No. 1—	per cwt.
Foreign	Nominal
Domestic	3.25 to 3.75
Wool Tares—	per cwt.
Light	3.50 to 3.75
Heavy	3.75 to 4.00
No. 1 Scrap Bagging	3.00 to 3.50
Manila Rope—	
No. 1 large	-*115.00
No. 1 small	-*105.00
Sisal Rope—	
No. 1 large	-*95.00
No. 1 small	-*80.00
New Burlap Cuttings	5.50 to 5.75
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	-*80.00
No. 2 sisal	-*60.00
Soft jute	5.00 to 5.50
Mixed	1.50 to 1.75

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER

OPA ceiling prices f. o. b. points of shipment, with brokers' allowance of 4 to 9 per cent.

Shavings—	per ton
White Env. Cuts, One-Cut	67.50-
Hard White Env. Cuts	62.50-
Hard White, No. 1	57.50-
Soft White, No. 1	50.00-
Soft White, One-Cut	57.50-
Soft White, Misc.	43.00-
Fly Leaf, No. 1	33.50-
Fly Leaf, Woody, No. 1	25.00-
No. 2 Mixed Col. Woody	18.00-
Flat Stock—	
Repacked No. 1 Heavy Books and Magazines	33.50-
Mixed Books	17.00-
Ledger Stock—	
No. 1 White	43.50-
No. 1 Mixed (Colored)	37.50-
Manilas—	
New Env. Cuttings	53.00-
New Env. Cuts, One-Cut	57.50-
Extra Manilas	37.00-
Manila Tab Cards, Free of Ground Wood	45.00-
Ground Wood Manila Tab Cards	27.00-
Kraft—	
Envelope Cuttings	65.00-
Mixed Env. or Bag Cuts	55.00-
Tripled Sorted No. 1 Brown	50.00-
New 100% Cor. Cuts	45.00-
No. 1 Old Assorted	35.00-
News—	
White Blank	33.00-
Overissue	17.00-
No. 1 Baled	15.00-
Old Corrugated Containers	23.00
New Corrugated Cuts	18.00-
Mill Wrappers	17.00-
Box Board Chips	14.50-
No. 1 Mixed Paper	14.00-

CHEMICALS

f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25-
Ground, cwt.	4.00-
Powdered, cwt.	4.40-
Blanc Fixe—	
Pulp, bulk, ton	40.00 to 46.50
Dry, barrels, pound	60.00 to -
Bleaching Powder—	
Drums, cwt.	2.25 to 2.10
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	24.00 to 24.75
80-100 mesh (bags), lb.	—
Argentine, lb.	30.00 —
China Clay—	
Domestic Filler	
Bulk (mine) ton	7.50 to 15.00
Domestic Coating	
Bulk (mine) ton	11.00 to 22.00
Imported (ship side)	
Bulk (lump) ton	15.00 to 36.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicia), lb.	.90 to .95
Glyc. (C.P.) drums, lb.	18.25 to 18.50
Litharge, powd., bbl., lb.	.09 to -
Rosin (Gum)—	
New York, per 100 lbs.	
E	4.67-
F	4.81-
G	4.83-
WW	7.32-
Rosin (Wood), carlots	3.64-
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	20.00 to
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30 -
Ground and flake, drums, cwt.	2.70 -
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.55 to 2.05
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.10-
Pearl, barrels, cwt.	3.20-
Paper (Bp.) bags, cwt.	3.20-
barrels, cwt.	3.30-
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	18.00 to 21.00
Imp. bulk, ton (Nom.)	—
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¾ to .06
Calcium Pig., bbls., lb.	.05 to .05¾
Zinc Sulphide, bbls., lb.	.5.60 to 5.85

WOOD PULP

OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo.:

Bleached softwood sulphite	76.00
Unbleached softwood sulphite	66.00
Bleached hardwood sulphite	73.50
Unbleached hardwood sulphite	63.50
Bleached Mitscherlich sulphite	81.00
Unbleached Mitscherlich sulphite	72.00
Northern bleached sulphate	86.00
Southern bleached sulphate	79.00
Northern semi-bleached sulphate	82.00
Southern semi-bleached sulphate	75.00
Northern unbleached sulphate	73.00
Southern unbleached sulphate	63.50
Bleached soda pulp	66.00
Unbleached soda pulp	62.00
Ground wood pulp	46.00
Sulphite screenings	38.50
Sulphate screenings	38.00
Ground wood screenings	30.00
Northern unbleached sulphate sideruns	73.00
Southern unbleached sulphate sideruns	63.50
Standard news print sideruns	46.00

PAPER

f. o. b. New York City

Boards—	per ton
Binders	84.00-
Chip	48.00-
Chip, tube and can	50.00-
Chip, full-bending	52.50-
Chip, sgl. mia. lined	60.00-
Coated, white patent	
.018	80.00-
.020 and heavier	75.00-
Kraft liner	62.00-
News	48.00-

Book Papers—OPA base maximum prices per cwt. 4 cases or equivalent, f. o. b. mill with quantity, weight, manufacturing and other differentials allowed:

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	8.25
B Grade E. F.	7.80
C Grade E. F.	7.55
D Grade E. F.	7.30
E Grade E. F.	7.05
No. 2 Uncoated Offset 4 sides. White	8.45

Coated White (Trimmed 4 sides)

No. 1 Glossy	11.90
No. 2 Glossy	10.85
No. 3 Glossy	10.15
No. 4 Glossy	9.80
No. 5 Glossy	9.30
C2S Offset	10.40
C1S Litho (Varnish)	10.05
C1S Litho (Non-Varnish)	9.80

Writing Papers—OPA base maximum prices per cwt. on writing papers, f. o. b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—	per cwt. 20 lb.	16 lb
Extra 100% Rag	34.00	34.00
100% Rag	28.00	28.00
75% Rag	20.00	20.00
50% Rag	16.00	17.25
25% Rag	14.00	15.00

Rag Content Ledger—	per cwt. Zone 1
Extra 100% Rag	35.00
100% Rag	29.00
85% Rag	26.00
75% Rag	21.00
50% Rag	17.00
25% Rag	15.00

Sulphite Bond—	per cwt. 20 lb.	16 lb.
Air dry, watermarked	12.75	13.70
No. 1 (M. F.) watermarked	9.60	9.70
No. 2 (M. F.) watermarked	8.25	8.85
Plain (M. F.) unwatermarked	7.60	8.20

Sulphite Ledger—	per cwt. Zone 1
No. 1 (M. F.) watermarked	10.00
No. 2 (M. F.) watermarked	9.25
Plain (M. F.) unwatermarked	8.60

Glassine (f. o. b. mill)—	per cwt.
Embossed (25 lb. up)	13.75 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleach. (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleach. (25 lb. up)	11.00 to 11.50
Unbleach. (25 lb. up)	10.00 to 10.50

News—OPA Ceilings	per ton
Rolls (Contract)	58.00
Rolls (Spot)	(nominal)
Sheets	66.00

Tissues (Carlots)—	per ream
White, No. 1	1.12½ to 1.20
White, No. 2	1.00-
Bleached Anti-Tarnish	1.15-
Colored	—
Anti-Tarnish Kraft	.70-
Manila	.90 to .95
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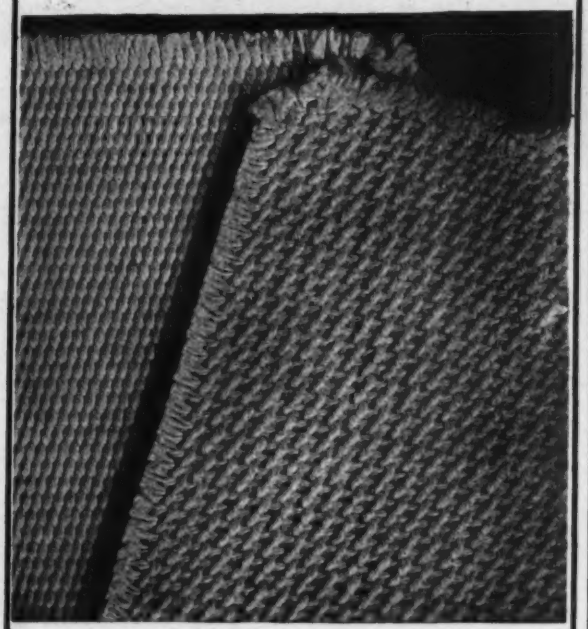

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Beloit Iron Works.....1177
Binney & Smith Co. 1287
Bird Machine Company.....
Black-Clawson Co., The.....1245
Blackmer Pump Company.....1257
Boston Woven Hose & Rubber Co. 1183
Bowser, Incorporated 1286
Bowsher Co., The N. P.....1284
Bristol Company, The.....1184
Buffalo Pumps, Inc. 1263
Calco Chemical Division, American Cyanamid Company .....
Cambridge Instrument Co., Inc. 1244
Cameron Machine Co. 1272
Carthage Machine Co. 1287
Cash Company, A. W.....
Chain Belt Company.....1204
Chemipulp Process, Inc.....1286
Chromium Corp. of America.....
Clark Tructractor Division of Clark Equipment Company .....
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Cooper Alloy Foundry Co., The.....1277
Corning Glass Works.....
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Downingtown Mfg. Co. .....4th Cover
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du Pont de Nemours & Co., E. I. 1201
Dura-Tred Company .....
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Eastwood-Nealley Corporation.....1250
English China Clays Sales Corp. 1278
Fairbanks Company, The.....
Ferguson & Co., Hardy S. 1287
Fitchburg Screen Plate Co., Inc. .....
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Frederick Iron & Steel Co. .....
Fritz Publications, Inc.....1289, 1292
Garlock Packing Co., The.....
Gates Rubber Company.....1265
General American Transportation Corp.
General Coal Co. 1279
General Electric Company.....
Glyco Products Company.....1285
Goulds Pumps, Inc. .....
Greene, Tweed & Company.....1273
Gruendler Crusher & Pulverizer Co. ...1246
Hardy, George F. 1287
Harper Company, The H. M. 1257
Harrington & King Perforating Co. 1284
Harris-Seybold-Potter Co. .....2nd Cover
Hills-McCanna Company .....
Hooper & Sons Co., Wm. E. 1239
Hudson-Sharp Machine Company.....1283
Hunt Machine Co., Rodney.....1280
Huyck & Sons, F. C. 1211
Improved Paper Mach'y Corp. .....
Industrial Gear Mfg. Co. 1278
Ingersoll-Rand Company .....
International Nickel Co., Inc. 1267
International Wire Works.....1276
Jeffrey Manufacturing Co., The.....
Jewell Belt Hook Company.....1283
Johnson Corporation, The.....1290
Johnstone Engrg. & Mach. Co. 1266
Jones & Sons Company, E. D. 1215
Kalamazoo Tank & Silo Co. 1258
Kalamazoo Vegetable Parchment Co. ..
Koppers Company .....
Langston Co., Samuel M. .....3rd Cover
Layne & Bowler, Inc. 1276
Leavitt Machine Co., The.....1182
Lewellen Manufacturing Co., The.....
Lindsay Wire Weaving Co., The.....1283
Link-Belt Company .....
Lockport Felt Company.....1270
Lunkenheimer Co., The.....1220
Mason-Neilan Regulator Co. .....
Mathieson Alkali Works, Inc. 1180
Menasha Products Co., The.....
Michigan Steel Casting Co. 1286
Monsanto Chemical Company.....1255
Morey Paper Mill Supply Co. .....
Morris Machine Works.....1251
Mosinee Paper Mills Company...1259-1260
Mt. Vernon-Woodberry Mills, Inc. ....
Murray Mfg. Co., D. J. 1257
Nash Engineering Co., The.....1287
National Oil Products Company.....1269
National Publishers Assn., Inc. 1218
National Research Bureau, Inc. .....
National Safety Council, Inc. 1285
Naylor Pipe Company.....
Neville Company, The.....
Nichols Engr. & Research Corp. .....
Norma-Hoffmann Bearings Corp. 1271
Northern Engineering Works.....1281
Norton Company .....
Norwood Engineering Co., The.....1217
Oakite Products, Inc. 1286
O'Donoghue, Roderick 1283
Ohio Injector Co., The.....
Oliver United Filters, Inc. .....
Orr Felt & Blanket Co., The.....1274
Paper & Industrial Appliances, Inc. ...
Paper Makers Chemical Dept. of Hercules Powder Company.....1243
Patterson Foundry & Mach. Co. ...1st Cover
Paulson, Peter A. 1286
Perkins & Son, Inc., B. F. .....
Photovolt Corporation 1286
Pittsburgh Piping & Equipment Co. 1199
Poole Foundry & Machine Co. 1284
Powell Company, The Wm. 1197
Pusey & Jones Corp., The.....1193
Reliance Electric & Engrg. Co. 1187
Research Corporation .....
Rockwood Manufacturing Co. .....
Rogers & Co., Samuel C.....1258
Rollway Bearing Co., Inc. 1178
Ross Engineering Corp., J. O. .....
Ryerson & Son, Inc., Joseph T. 1285
Sandusky Foundry Machine Co. .....
Schutte & Koerting Co.....
Shartle Bros. Machine Co. 1245
Shuler & Benninghoven.....1247
Simonds Saw and Steel Co. .....
Simonds Worden White Co. .....
SKF Industries, Inc. 1189
Smith & Winchester Mfg. Co. 1289
Smith Corporation, A. O. .....
Solvay Sales Corporation.....
Standard Oil Co. (Indiana).....1205
Stanhope, L. M.....1286
Stebbins Engrg. & Mfg. Co.....1240
Stein, Hall & Company, Inc.....1195
Stickle Steam Specialties Co.....
Swenson Evaporator Company.....1186
Taber Instrument Corp.....
Taylor Forge & Pipe Works.....1241
Texas Company, The.....1179
Timken Roller Bearing Co., The.....1249
Titanium Pigment Corporation.....
Towmotor Corporation 1275
Trimbey Machine Works.....
Turner Halsey Company.....
U. S. A., Treasury Dept.....1208
United States Rubber Company.....
Valley Iron Works Company.....
Vanderbilt Co., Inc., R. T.....1212
Wahlert Products Corporation.....
Waldron Corporation, John.....
Warren Steam Pump Co., Inc.....1268
Warwick Wax Co., Inc.....
Waterbury & Sons Co., H.....1283
Waterbury Felt Co., The.....1276
Western Precipitation Corp.....
Weyerhaeuser Timber Co.....
Whiting Corporation 1186
Williams and Co., C. K.....1290
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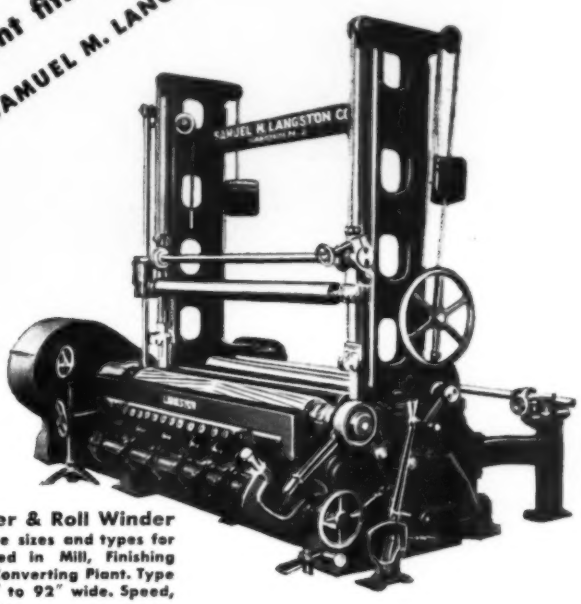

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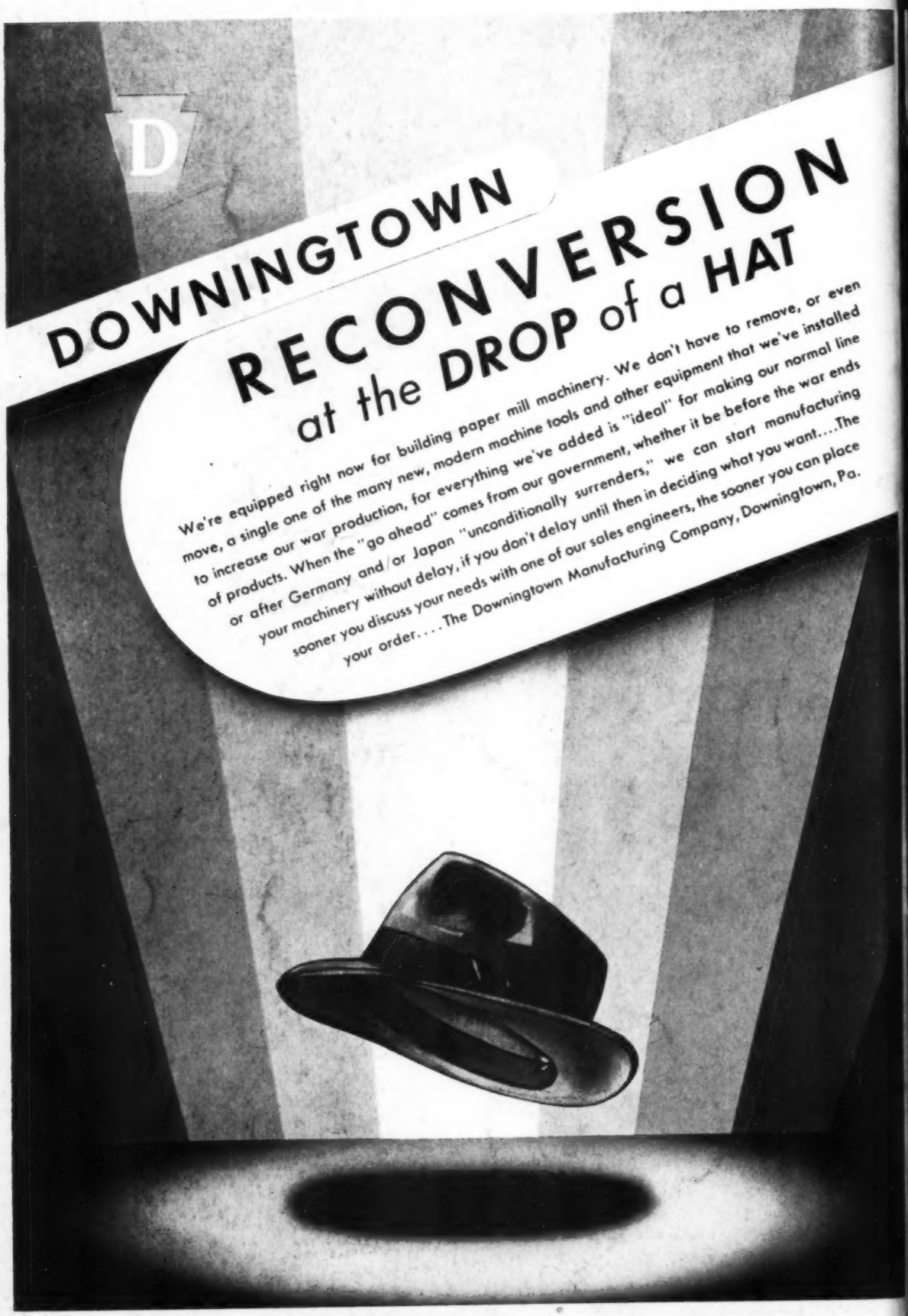
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